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ABSTRACT

"Zero to Three" is a single focus bulletin of the National Center for Infants, Toddlers, and Families providing insight from multiple disciplines on the development of infants, toddlers, and their families. Noting that knowledge of children's musical experiences in context is central to understanding children's lives, and that reciprocally, knowledge of current trends in fields such as early childhood development and neuroscience informs interpretations of children's musical experiences, this issue focuses on ideas for using what is known about the musical lives of children to promote and protect children's healthy development. The featured articles are as follows: (1) "The Musical Lives of Young Children: Inviting, Seeking, and Initiating" (Lori A. Custodero); (2) "Musicality and Music before Three: Human Vitality and Invention Shared with Pride" (Colwyn Trevarthen and Stephen Malloch); (3) "Mothers Are Musical Mentors" (Sandra E. Trehub); (4) "Lullabies and Playsongs: Why We Sing to Children" (Laurel J. Trainor); (4) "Music in the Time of Toddlers" (Danette Littleton); (5) "From Mozart to Motown, Lullabies to Love Songs: A Preliminary Report on Parents' Use of Music with Infants Survey (PUMIS)" (Lori A. Custodero, Pia R. Britto, and Tao Xin); and (6) "The Toddler Top 40: Musical Preferences of Babies, Toddlers, and Their Parents" (Elissa Johnson-Green and Lori A. Custodero). Also included are an annotated list of musical resources (Beatriz Ilari and Elissa Johnson-Green) and a description of a center for children in families in North Carolina (James Sexton). (HTH)

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ZERO TO THREE

September 2002
Volume 23 No. 1

Journal of ZERO TO THREE: National Center for Infants, Toddlers, and Families

The Musical Lives of Babies and Families

What, How, and Why Parents Sing to Babies

How to Nurture Babies' Inborn Musicality

Music Therapy in the NICU

The Toddler Top 40: Favorite Songs and Music of Very Young Children and Their Parents

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EDITORS' NOTE

Knowledge of children's musical experiences in context is central to understanding children's lives. Reciprocally, knowledge of current trends in fields such as early childhood development, neuroscience, and social psychology informs interpretations of children's musical experiences. This issue of *Zero to Three*, on the musical lives of babies and toddlers, brings ideas from multiple fields of inquiry together. It offers an excellent example of how the infant/family field grows.

• Growth occurs when infant development researchers (known to each other as "baby watchers") start to pay attention to a phenomenon that no one in the scientific community has noticed before — for example, that babies seem to be much more enthralled by their mothers' singing than by the voice of a trained performer. "What is this all about?" the researcher asks, and begins to develop a hypothesis and a research design to test it.

• The infant/family field grows when creative thinkers in disciplines or settings that are seldom associated with babies and toddlers envision and build connections with baby watchers (we call this "boundary spanning"). For example, **Suzanne Perrino**, Director of Education and Outreach, Pittsburgh Symphony, and her colleagues identified an unmet need for music in early childhood settings and, to inform their planning, invited researchers from a range of disciplines to discuss music's impact on early development.

• Lively conversation builds the infant/family field. At the Pittsburgh Symphony symposium, **Lori Custodero**, Assistant Professor of Music and Music Education, Teachers College, Columbia University, met **Kyle Pruett**, Clinical Professor of Psychiatry, Yale Child Study Center, and Past President, ZERO TO THREE. Kyle conveyed his enthusiasm about Lori, her research, and her classroom work with babies and toddlers to **Emily Fenichel**, Editor of the *Zero to Three* Journal. Lori and Emily began talking, and started to plan this issue of *Zero to Three*.

• Growth in the infant/family field depends on the generosity of researchers, clinicians, teachers, students, parents, and grandparents. The contributors to this issue of *Zero to Three* include all of the above. They have given unstintingly of their abundant wisdom (and scant free time) in order to share with the widest possible audience what they have learned about the musical lives of babies and toddlers.

• Financial support is essential to the growth — indeed, to the very survival — of the infant/family field. We gratefully acknowledge the **MetLife Foundation** not only for making this special issue of the Journal possible, but also for supporting the development of the accompanying brochure for parents, *Getting in Tune: The Powerful Influence of Music on Young Children's Development*, and "tip sheet" for child care providers. *Getting in Tune* and the tip sheet also will be available in Spanish.

Although the "Mozart Effect" may have been misrepresented in the press and popular media, the "ripple effect" is a reality in the growth of the infant/family field. For more than a quarter of a century, infant/family professionals, translating rigorous research into policy and practice, have made a substantial positive impact on the lives of babies, toddlers, families, and communities. The contributors to this issue of *Zero to Three* offer myriad ideas for using what we know about the musical lives of very young children to promote and protect their healthy development. We invite readers to share experiences and ideas about babies and music through Letters to the Editor (efenichel@zerotothree.org), which will be printed in forthcoming issues of *Zero to Three*.

We look forward to continuing to work together — and with colleagues and partners around the world — to enrich the musical lives of infants, toddlers, families, and communities.

Lori Custodero
Guest Editor

Emily Fenichel
Editor

ZERO TO THREE

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The Musical Lives of Young Children:

Inviting, Seeking, and Initiating

Lori A. Custodero
Teachers College, Columbia University, New York City
lac66@columbia.edu

In a hospital birthing room, a newborn gazes into the face of his mother. He is attracted to her lilting voice, which is clearly directed toward him. The sounds he hears are musical gestures — short, undulating phrases punctuated with silence and offered with an expectation of his response. In an intuitively communicative act, the child affirms the adult by vigorously moving his arms and legs, imitating his mother's exaggerated facial expression, and making his own sounds. He then becomes still, inviting her to continue the rhythmic and melodic dialogue.

At an infant/toddler child care center, caregivers with babies in their arms dance to a favorite recording, playfully moving in space to the patterns in the music, changing the direction of their steps as one musical phrase ends and another begins. The babies grin with delighted recognition at the sensation of movement to aural cues, and anticipate the sequence of musical changes by leaning their bodies or turning their heads toward the new direction. Older, more mobile children move to the music on their own, with each other, and with their own "babies," in imitation of the caregivers. The emotional content of the music seems to unite the group. At the same time, however, each child or adult in the room draws upon the social context as needed, seeking out an individually meaningful experience.

At a restaurant, a 3-year-old creates a song to accompany her object play with a spoon. She slowly moves the spoon through the air and sings her own melody and words: "I'm flying in the airplane to see my grandma," adding a familiar chorus, "E-I-E-I-O." Seamlessly, she interweaves cultural artifacts — that is, excerpts from composed songs — with spontaneously conceived musical material whose lyrics reflect recent events of importance to her. While her mother and father are involved in conversation with one another, she cares for and comforts herself, initiating her own cognitively challenging experiences with music.

As these three vignettes suggest, children are inherently musical beings. Infants and toddlers invite, seek, and initiate musical interactions with objects and people. The rhythms and melodies of adults' earliest efforts to connect with babies reflect the intuitive nature of musical communication. Through their sensitivity to the musical qualities of sound, infants and young children invoke musicality in the adults who interact with them. In a shared social setting or in solitude, music is meaningful to very young children and motivates them to participate physically, emotionally, and cognitively. Musical expression provides young children with a personally rewarding resource, as accessible as the imaginative worlds they construct.

As a music researcher, I have spent much time observing and reflecting upon the musical behaviors of very young children and their caregivers in a variety of natural settings, often participating in the music-making myself. I have interviewed parents and caregivers and have seen

at a glance

- Infants and toddlers invite, seek, and initiate musical interactions with parents, caregivers, and objects in their environments.
- The conversations between parents and babies are similar to jazz in their free-form give-and-take.
- The "musical" nature of parents' speech to babies seems to be instinctive.
- Using music, young children explore movement, emotions, and thoughts, with others or alone.

PHOTO JUDITH GUERRERO

and heard firsthand how music-making creates contexts in which children, teachers, and families thrive. This article describes the communicative, engaging, and expressive nature of young children's music-making, drawing upon multiple fields of study. Along with my co-contributors to this special issue of *Zero to Three*, I aim to provoke new thinking about the social, emotional, cognitive, and adaptive functions of musical activity in the early years.

The Intuitive Nature of Musical Communication

Inviting Musical Interactions

Much infant research has focused on the communicative relationship between caregiver and child, what Gopnik and colleagues (1999) refer to as our "nature to nurture." Researchers have analyzed conversations between parents (mostly mothers) and infants for their melodic and rhythmic qualities. Melodically, when adults speak to babies, our voices are higher pitched, and our phrases have distinct contours that carry messages seemingly across cultures (Papousek, 1996). For example, a rising shape is used to arouse attention; a falling shape is meant to calm. Additionally, the rhythmic features of our infant-directed speech are different from those of adult-directed speech: when talking to babies, adults tend to use shorter phrases with more pauses between them, inviting responses from the child. Typically, this musical style of speech is not taught; it is the intimate, instinctive way that adults interact with infants.

In her contribution to this issue, **Laurel Trainor** addresses the emotional content of infant-directed speech. She suggests that it is precisely its heightened emotional nature that distinguishes infant- from adult-directed speech, and that which makes speech directed toward infants *musical*. This link is supported by cultural anthropologist Ellen Dissanayake, who describes the power of musical interaction between mother and child to "coordinate the emotions of participants and thus promote conjoinment" (2000a, p. 390). Seeing early music-making as a survival mechanism, Dissanayake credits the mutuality learned in these mother-child interactions with helping us evolve as humans — learning about belonging, finding and making meaning, acquiring competence, and elaborating meanings and competencies (2000b).

From a psychological perspective, infant perception of predictable caregiver signals stimulates cognition and contributes to a trusting relationship: Adults connect with infants through patterned, contoured messages, and infants respond to and imitate the musical messages they receive. Invitations to engage communicatively are delivered by both parties; this adult-child interaction has been considered significant in infant development from its disciplinary beginnings. Bowlby addressed the significance of this "reciprocal interchange" (1969/1982, p. 346) in terms of attachment. More recent perspectives include investigations of "joint regulation" (e.g., Brazelton, 1982), "joint attention" (e.g., Adamson & Russell, 1999), "attunement" (Stern, 1985), and intersubjectivity (Trevarthen, 1999/2000, and in this issue).

The work of both Stern and Trevarthen is especially pertinent, as both have applied rhythmic and melodic characteristics to their interpretations of infant social experiences. Stern (1999) has looked at both the temporal and dynamic nature of early interactions in terms of "vitality contours," which are described in much the same way as music is described. Investigations into intersubjectivity between mother and infant by Trevarthen address the educative characteristics of early musical communication. He has found that the synchronous rhythmic patterns demonstrated in motoric and aural responses of infants to caregivers' cues define healthy development. In contrast, Field (1998) found that when mothers suffered from post-

partum depression, the rhythms of interaction between mothers and their babies were not "in sync." However, when mothers' clinical symptoms abated, the rhythms of the dyad became synchronous once again. Current research involving microanalysis of infant-adult interactions with mothers and with strangers confirms how the rhythms of these dialogues — what I might call duets — define attachment, and are associated with positive cognitive outcomes. The coordinated quality of these rhythms, interpreted as "performance knowledge" in 4-month-old infants, could predict higher scores on pattern-related measures when the infants were 12 months old (Jaffe, Beebe, Feldstein, Crown, & Jasnow, 2001).

The musical nature of our coordinated conversations with babies is similar to the musical conversations between jazz musicians. Both types of communication require a shared understanding of the musical structure, like "your turn, my turn." Both jazz musicians and adult-infant pairs also require a level of trust in their performing partners for successful creative collaboration. Hugh Davies said that artistry "is only possible when improvising musicians know each other well enough for a common language to come into being, and mutual trust in each other permits one to push against the limitations of that language..." (Bailey, 1992, p. 95). **Sandra Trehub** (2001, and in this issue) provides evidence for common musical language competencies of adults and children; her research has revealed that infants perceive music in much the same way adults do.

In a phenomenological study of collaborative musical improvisation with two composers, the profound significance of the communicative experience was described by the artists as "being with oneself and at the same time being with another," and "creating space for someone and joyfully ... taking your own" (Custodero, 1996). These descriptions are reminiscent of the literature on infant experience of self and other (e.g., Stern, 1985), as well as the synchronicity of "creating and taking space" in interaction analyses mentioned above. Seeking further evidence of the nature of early musical experiences, we at Teachers College undertook the Parents Use of Music with Infants Study (PUMIS). In a telephone survey, we asked 2250 parents of 4- to 6-month-olds how and why they use music in their caregiving. (See **Custodero, Britto,** and **Xin,** this issue, for a report on our preliminary findings.) Parent responses to questions about general attitudes and values with respect to music support the hypothesis that early musical experiences between adults and babies are intuitive. Over 84% of those surveyed agreed with the statement that "parents are naturally inclined to sing to their babies."

Young children express individual responses to the music of their culture through their clear preferences for particular songs, instrumental music, and recordings.

That parents believe in the intuitive nature of singing to babies is not surprising, as conventional parental roles are commonly associated with song. Lullabies and playsongs serve to comfort ("Hush-a-bye, don't you cry") and teach ("Pat-a-cake, pat-a-cake") as well as to communicate messages about routines like bedtime or bathing. In a survey on ZERO TO THREE's Web site (www.zerotothree.org), parents and professionals named the favorite songs of babies and toddlers in their care and commented on the role of music in the lives of infants, toddlers, and families. Many respondents reported that babies and toddlers would anticipate a particular part of a beloved song through their body movements and vocal sounds — their dancing and their singing. Responses from the **"Toddler Top 40"** Survey are summarized in this issue. They remind us that collective music-making is both a social and a cognitive enterprise. They also teach us that adults who observe very young children carefully will learn to recognize the ways in which very young children invite us to be musical with them.

The Compelling Nature of Musical Engagement

Seeking Musical Challenges

As infants and toddlers develop, their musical experiences change. Analyzing data from a survey of more than 2000 families with children from birth to 3 years of age, we found that parents reported singing and playing music less frequently for the older children in this age group than for younger ones (Custodero, Britto, & Brooks-Gunn, 2001). While sending and receiving invitations to interact musically may continue throughout the lifespan, parents' intuitive use of musical communication with young babies may be replaced by a culturally influenced preference for using spoken language with older infants and toddlers. This transition affects the developing child's vocal production: Word rhythms replace the more freely articulated musical babbling. Later, the wide melodic range of high and low sounds that young babies explore becomes restricted to the narrower pitch range of spoken language. Yet as children become increasingly able to regulate their own physical and emotional states, they begin to seek out their own distinctly musical experiences — alone and with others.

As the theory of mastery motivation suggests, young children actively seek out personal challenges (McCall, 1995). Musical experiences provide young children with multiple, attractive opportunities for action and meaning-making.

- **Music challenges us to be involved with many senses simultaneously.** Children can simultaneously *hear* sound; *see* adults repeat a movement when the sound repeats; *move* in a new way at a musical cue (for example,

"Roll 'em" in the "Pat-a-cake" song); *see* shapes move (as they watch the increasingly popular Baby Einstein® videos); and *feel sound* as they play instruments, sing, and move. Musical experiences, then, provide children with a variety of entry points (hearing, seeing, feeling) into aesthetic, sensory, and cognitive challenges. This variety allows activities to be adapted to meet individual needs — either by the child herself, or by a parent, therapist, or educator.

- **Music challenges us to express and be responsive to personal and cultural meanings.** Young children express individual responses to the music of their culture through their clear preferences for particular songs, instrumental music, and recordings. The young toddlers with whom I work have strong allegiances to specific recordings — "Roses" (It's a Wonderful World) belongs to Adelaide, while "New World Comin'" is Pauline's favorite. Associations between musical repertoire and social contexts are also important for young children. They often use music as a transitional object that offers the comfort of the familiar in strange settings. A song that is identified with a significant person or place can also bring close that which is absent.
- **Music challenges us to organize sounds over time.** Throughout our lives, we strive to make sense of sounds we hear and sounds we produce — we look for patterns (for example, with repetitive phrases) and consistency (for example, a beat that we can follow). The multi-sensory feedback discussed above helps us respond effectively to this challenge — seeing the beat modeled in the feet of marching band members in a parade or feeling the sensation of falling down at the end of "Ring Around the Rosey" is what makes the musical experience enriching. Bowlby (1969/1982) recognized this relationship of music to cognitive structures when he chose singing as the illustrative behavior in his discussion of goal-setting. Laying out his theory of multiple intelligences, Howard Gardner (1999) hypothesized that what makes *music* intelligence special may be its function as a primary organizer of cognition.

Because it is physically, socially, and cognitively challenging, musical activity is compelling for young children. In this issue, **Colwyn Trevarthen** discusses the Intrinsic Motive Pulse (IMP), which involves a brain-generated system of motoric and affective responses to the challenging, emotional narrative of music. Similarly, my own research has focused on the motivating character of music in children's lives. Borrowing from the paradigm of flow experience (e.g., Csikszentmihalyi, 1997), I am investigating how children match their skills to appropriate levels of challenge when they engage in musical activity.

Our observations at the Rita Gold Early Childhood Center at Teachers College, Columbia University, illustrate these principles. In the infant and toddler rooms, young children seek out musical activity. My research team provides the only "structured" 30-40 minutes of the week for each group. The structure is imposed by opportunities inherent in shared musical activity itself — our curriculum emerges from the repertoire of songs the children ask for and the "ecological milieu." For example, if a child has acquired a new sibling that week, all the children in the classroom are likely to have "become" parents and/or babies in their dramatic play. We and the children then sing lullabies, dance with babies, and play baby games with our own "babies."

Each child's involvement reflects his or her unique experiences, temperament, and physiology; the quality of a child's engagement with music tends to be consistent over time. We observe infants and toddlers as they initiate and monitor their own involvement as they expand previous iterations of the musical "task" by adding new movements, object play, or interactions with others. Sometimes young children demonstrate their exceptionally high level of engagement with musical activity by continuing an activity after the rest of the group has finished, or by anticipating the sequence of songs and recordings in our weekly sessions.

Parents who happen to be observing their children at the Center during a musical activity occasionally find the impulse to participate irresistible. Two-year-old Tina's mother was watching in the observation booth one day as I introduced a Japanese song, then began to sing it with a group of children. The usually quiet Tina shouted, "Mommy, Mommy!" as her mother, a woman of Japanese descent, bounded into the room, freed from the anonymity of the booth, asking, "Do you mind if I join you?" I welcomed her presence, and she quickly gathered Tina in her arms and began singing and energetically rocking. Tina then stood, and she and her mother grabbed hands and swung back and forth as her mother sang the song again.

Tina's mother could not stifle the urge to make music with her daughter. It may have been the familiarity, the culturally imbued representation of herself, or a connection to her past that led her to join in. The associative nature of music is compelling — it can take us to different places and different times.

Music often evokes cognitive abilities in children that might otherwise go unnoticed. In a parent interview about the musical life of her 2-year-old, John's mother told the story of his fascination with musical comedies. The family had many on home video, and John was particularly fond of *The Wizard of Oz*. One evening at the end of his bath, his mother observed him staring at the water going down the drain and singing the tornado theme from the movie!

We seek music because it allows us to express feelings and knowledge that are otherwise inexpressible. We also seek music because it is healing. Therapists report using music successfully in medical and clinical settings. In this issue, **Jayne Standley** reports on her study of how music use in the NICU has helped premature infants regulate non-nutritive sucking and acquire other survival skills.

The comforting and cognitively stimulating qualities of musical experience serve these at-risk infants by providing an accessible means to regulate the sonic environment as well as their own physiological and psychological states.

The Rewarding Nature of Musical Expression

Individual Agency and Shared Meaning

Communicative musical interactions induct infants into the world of *shared* understanding; they can access these interactions through offering and responding to vocal invitations. And as they gain a sense of self and mature physically, children can vigorously seek out musical activities that offer them *personally relevant* challenges. Thus, examining young children's musical expression calls for a focus on both its social component and its potential for thoughtful individualized interpretation. In order to see young children as intentional music-makers who actively initiate collaboration with others and purposefully explore and play with musical sounds and musical objects, adults may have to cultivate new levels of attention to children's behaviors.

We seek music because it allows us to express feelings and knowledge that are otherwise inexpressible. We also seek music because it is healing.

Consider, for example, how young babies attract their mothers' attention. They imitate characteristics of their mothers' voices (Fox, 1990), and they repeat vocal sounds, often transforming a sound by altering its duration and interspersing movement responses. In this way, the activity is both individually controlled and collaborative. The older infants and young toddlers with whom we work initiate music-making by using objects such as a mirror, scarf, or book: Each object represents a specific song.

The rewards of engagement are individually self-monitored, as can be seen in varied responses to a single musical activity. In one recorded episode from our study, Alice sits in my lap with a book and sings the "Five Little Ducks" song while Peter stands off to the side near a caregiver, holding a wooden duck puzzle piece. He sings the "Quack, quack, quack, quack" segment of the song, putting the puzzle piece up to his ear. Such individual responses reveal children's abilities to manipulate musical activities for their own needs — to engage with others, to imagine, to physically enact. These behaviors demonstrate an artistic sensibility, a personal symbolizing of experience expressed in a comfortable environment; the activity has personal relevance within a social context. Just like the adult improvisers mentioned earlier, these children find ways to be with themselves and at the same time be with another.

Two- and three-year-olds often interpret musical material by creating spontaneous songs (remember the three-year-old in the restaurant described in the beginning of this article) and by using learned songs in new contexts in ways that are socially meaningful. In collecting reports from caregivers at the Rita Gold center, we found that children often revisit and reconstruct songs we've done together when presented with a cue in the immediate environment. On one occasion, for example, a group of toddlers began singing "Bell Horses" when putting together beads on a string, which they had been using for "reins." Through song, they could express a cognitive association that bridged contexts and had meaning for all of them because of their shared social understanding of a musical experience.

Very young children also initiate transformational and collaborative behaviors in their free play with musical instruments. Children in the toddler room negotiate the equivalent of chamber music ensembles playing alongside one another. They also transform instruments into familiar objects — for example, blowing through the hole at the end of the triangle striker as if it were a bubble wand, and turning drums upside down and filling these "bowls" with shaker "eggs." As a leading researcher on cross-cultural perspectives on young children's music making in the context of play, **Danette Littleton** has documented young children's creative and intentional musical play with instruments (e.g., 1998). Her essay in this issue provides an insightful account of the imaginative, musical world her toddler granddaughter inhabits.

Growing knowledge about the *individual* nature of musical expression and the *interdependent* nature of musical communication has important implications for early childhood policy and practice. Envisioning the *musical child-as-agent* requires sensitivity to several core concepts in child development (Shonkoff & Phillips, 2000). These include the processes of self-regulation; the acknowledgment of children's active participation in their own learning; the existence of individual pathways to common developmental goals; and the efficacy of intervention strategies. Envisioning the *musical child-in-context* requires sensitivity to the permeating role of culture and the foundational nature of relationships to healthy development. The artistic nature of music, which allows for so many interpretive possibilities within a structured framework, invites personal decision-making about how to become involved. For example, listening to a recording might invoke moving to the beat — a singular response with multiple possibilities, including what body part might be moving (hands, fingers, feet, torso, head) and what type of "beat" is being reflected (most music has multiple layers of "beats"). Attending to and recognizing very young children's choices of musical behaviors may require adults to use their eyes and ears in new ways. This is especially true for teachers or therapists, whose role has been defined only as transmitting knowledge and skills, rather than as providing environments where young children can initiate their own expressions and reap the reward of creative activity.

Conclusion: Musical Lives in Context

This essay has offered two complementary views of the musical lives of young children. One view focuses outward, represented in our efforts to communicate with each other. A second view focuses inward, represented in our intentional responses to musical challenges. These perspectives are not mutually exclusive, but mutually informative. While there is little empirical evidence regarding music's influence on the infant brain, there are indications that it functions indirectly through promoting what Ian Cross (2001) refers to as "cognitive flexibility," and by creating an affective context for optimal development. It may be that the challenges inherent in musical activity are evolutionary, and that by attending to our biological disposition to music-making (Trehub, 2001), we are indeed making cognitive connections.

I invite you to reconsider what children's music-making sounds like and looks like, and how music serves babies and toddlers in their interactions with others and on their own. Consider the potential for communication and self-expression as infants invite, seek, and initiate melodic and rhythmic activity. Consider the cognitive implications of music's temporal structure as you sharpen your awareness of children's symbolizing of music through song, gesture, and movement. And most important, consider music-making as a reciprocal process: when we acknowledge the artistry in the infants and children with whom we work, we find artistry in ourselves.

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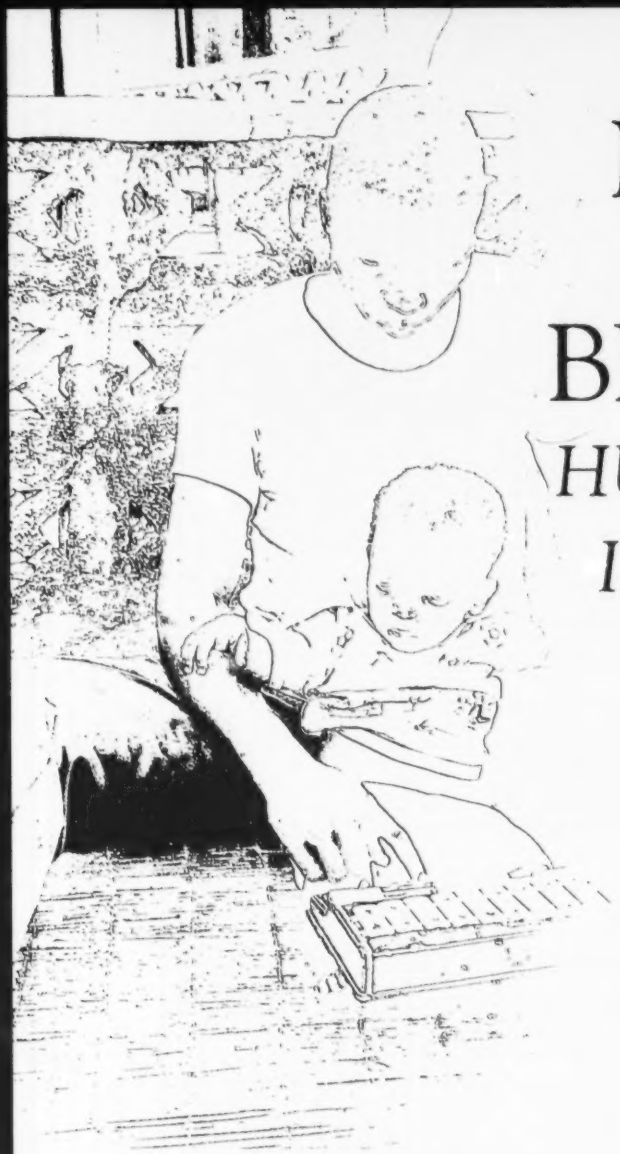

MUSICALITY AND MUSIC BEFORE THREE:

HUMAN VITALITY AND INVENTION SHARED WITH PRIDE

COLWYN TREVARTHEN
Department of Psychology
The University of Edinburgh, Edinburgh, Scotland
c.trevarthen@ed.ac.uk
and
STEPHEN MALLOCH
MARCS Auditory Laboratories
University of Western Sydney, Australia
s.malloch@uws.edu.au

PHOTO: COLWYN TREVARTHEN

The idea that communication and play with infants and toddlers has an innate "musicality" is not new. Joannes Amos Comenius, writing in the 17th century, valued the musical games of childhood and advocated their fostering, as did Froebel more recently. Mechthild and Hanus Papousek have written of the "biological and cultural origins of early musicality," of "melodies in caregivers' speech" conceived as a "species specific guidance towards language," and of the "musical elements in infant's vocalisation" (Papousek & Papousek, 1981; Papousek, 1994; Papousek, 1996). In the past 25 years, many research studies have confirmed that music and song have special importance for young people (indeed, people of all ages), enriching their vitality. It seems that musical patterns are at the generative heart of the communication that animates human cultural learning.

And why not? All human relating, communicating, and sharing of purposes and consciousness depends on sympathy between moving minds and bodies — sympathy based on imitation of the pulse of acting with awareness and feeling, and on sharing the sense of time in the mind. Relating through music and language is something we do naturally. Music and language are not "things" to be learned. We make language with pitch movement and rhythmic timing, body and voice moving together in a choreographed act of meaning with others. We make music or poetry when we express the motives for moving in a special communicative way, riding the cross-currents of intersubjective experience. A toddler learns language because he or she loves to discover thoughts and meanings with others in shared intention, and in rhythmic exchanges of expressive movement.

The young child's cleverness at picking up the sense of actions and things symbolized in our talk should remind us that words written as texts and music written as scores — the time-defying records we make of this information-rich behavior — are *products* of moving in meaningful expressive ways. They are keys to the collective consciousness of a community that has grown in talk, play, work, and meaning

over many generations. But they in themselves are out of living time, waiting for the imagination of a reader or performer to give back to them the experience of moving.

Efforts of developmental scientists to find how infants learn to communicate, and to define what mothers and fathers do to make speech attractive for an infant and truly communicative, have led to experiments on what a baby can discriminate in sounds: of human speech, of objects being used, and of song and musical instruments (Fassbender, 1996). Surprising discoveries have been made about infants' musical listening and their natural preferences (Trehub, 1990; Trehub, Schellenberg, & Hill, 1997). Even a premature newborn may actively contribute to a precise rhythmic exchange of vocal sounds, helping to co-create a single "narrative" of feeling (Malloch, 1999; Trevarthen, 1993). The findings show we are born with a sensitive awareness of the emotion and skill of "performance" — that we can join in time with the adventure of self-expression in company.

An infant may enter into the ryhthms and melodies of a conversation minutes after birth.

Babies know a lot instinctively, but they also learn quickly, especially about the experiences of being in the world of communicating humans. Sensitivity to rhythms and melodies of song and music may result from a perceptual learning similar to that which leads to speech — one that begins not empty or without structure, but with innate time sense, "perfect pitch," judgment of harmony or disharmony of expression, and a preference for grace over awkwardness. Is this a "pan-musical" sense from which awareness of particular music types is selected?

The Science of Musicality in Communication

We have formulated a theory of the motives of Communicative Musicality that defines the fundamental forms of expression and artistic creation for all temporal arts — theater, dance, poetry, and what we know as "music" — and explains the infant's appreciation of musical patterns. This theory attempts to describe the dynamic sympathetic state of a human person that allows "coordinated companionship" to arise (Malloch, 1999; Trevarthen, 1999).

Communicative musicality seems to be an intrinsic organizing principle for all movements in healthy parent-infant interactions (Malloch, 1999, 2002). Communicative musicality facilitates turn-taking on a shared pulse, regulates the pitch-contours of the vocalizations of both parent and infant, and inflects the timbre of vocalizations. We hypothesize that the capacity to generate and participate in communicative musicality allows us to "spend time" meaningfully with another person, regardless of age, and to allow this time to be shaped into mutually satisfying narratives of interaction through the inflection of vocal and bodily gesture (Malloch, 1999). This is the "cradle of thought" in which an awareness of symbols grows at the close of infancy (Hobson, 2002).

We define Communicative Musicality by three dimensions: pulse, quality, and narrative (Malloch, 1999):

1. *Pulse* is the regular succession of discrete behavioral steps through time, linking the present to the past, representing the "future creating" process by which a subject may anticipate what might happen and when.
2. *Quality* consists of the contours of expressive vocal and body gesture shaping time with expressive movement.
3. *Narratives* of individual experience and of companionship are built from the sequence of units of pulse and quality found in jointly created gestures — how they are strung together in chains of expression that generate affect.

It is easy to observe communicative musicality in early parent-infant communication because the meaning of the adult's words cannot play a role, and because the infant and parent are typically eager to "attune" with each other (Stern, Hofer, Haft, & Dore, 1985). Parent and infant make use of the parameters of pulse, pitch-gesture, and timbre-gesture — so vital to musical art — to form vocal narratives of shared emotion and experience (together with gestures of the body). When communicating in a way satisfying to both, they sustain a coordinated relationship through time.

Infants Are Born Musical, Ready for Intuitive Parenting and Parentese

An infant may enter into the rhythms and melodies of a conversation minutes after birth. Parent and child meet in mutual intentionality and with sympathetic emotions. This is stage one of a journey that leads in the first year of life to a collaboration in noticing and doing, and to an inventive and practical consciousness that can gain the child a confident and proud place in a cultural world.

When a parent talks to a baby, the voice is melodic, with specific vocal qualities of pitch and timbre (Fernald,

at a glance

- From the time of birth, infants are able to engage musically with parents and caregivers.
- Music is used differently in the stages of an infant's development: first to calm and arouse, then to provide an opportunity for performance and sharing.
- An infant may learn language patterns by first recognizing musical patterns in a parent or caregiver's speech.
- "Communicative Musicality" is a term used to explain using music to converse emotionally with others.

1992; Malloch, 1999). Motherese, or Parentese or Infant-Directed Speech (IDS), is organized in repeated phrases. It creates animating incidents and slow, cyclic "narratives" of emotion. Daniel Stern (1993, 1999, 2000) has described the "dynamic narrative envelopes" of a mother's utterances, with their fluctuating urgency and intensity. These have been identified as training for the infant's self-awareness and consciousness of agency. On the other hand, the precision of the infant's mirroring of feelings with smiles and coos is evidence for the interpersonal nature of the communication. Newborns actively synchronize with salient moments in the adult's message by gesture or utterance, predicting what the parent will do, and infantile "coo" sounds can be matched in pitch and quality (timbre) between them. Adults speaking to infants often imitate baby sounds, reflecting the melody, pitch, and quality of the infant's preceding utterance. There is a sensitive two-way mirroring of the enhanced emotional values of expression that is a bridge between the great difference in maturity of the baby and the adult.

Parentese projects the feelings, interests, and intentions of the speaker clearly. As Mary Catherine Bateson, an anthropologist and linguist, points out, "protoconversation" with a 2-month-old relates to both education in language and to the rhythms and melodies of religious ritual and communion, or traditional healing practices (Bateson, 1979). It engages human communicative motives in more than linguistic ways. Speech to infants in different languages has universal rhythmic and prosodic features — for example, everywhere in the world rising contours elicit and maintain infant attention more than falling contours (Fernald, 1992; Papousek, 1994; Trehub, 1990). Infants are more interactive, interested, and emotionally positive to IDS than to adult-directed speech. IDS engages attention, communicates affect, facilitates social interaction, and helps language acquisition — all consequences of an adult's and infant's innate motives for communicating the primary impulses of a conscious agency.

Musicality, Vital Companionship, and the Subtleties of Art

Infants are sensitive to the "inner meaning" of music. Their selective orientation to musical sounds, detection of musical features of sound, and vocal and gestural responses that are timed and expressed to contribute to a joint musical game (Dissanayake, 2000; Papousek & Papousek, 1981; Trehub, 1990) confirm that music has strong roots in human nature.

The communicative musicality of infants and toddlers — their love of singing sounds, dancing gestures, and melodramatic narrative games — is an expression of motives seeking sympathy and companionship that are essential for all cultural learning and the mastery of all meaningful thoughts. We believe that this vitality, which is neither "language" nor "music," reveals the general capacity to be communicative in the peculiar polyrhythmic, stepping, swinging, dancing, and "melodic" way human bodies move to celebrate and share (Trevarthen, 1999). This means that when a playmate *joins* in musical and dancing games with an infant or toddler — not simply exposing the child to the sounds called "music" — he or she is sharing motives that generate the flow of acting and thinking. Communicative musicality means to have, share, and affirm emotions. As the Norwegian musicologist and teacher Jon-Roar Bjørkvold (1991) observes:

> The mother stimulates the child and the child stimulates the mother in such a way that the result is far more meaningful than either could have produced alone. . . Mother and child "swing" together in a common rhythm, and in so doing strengthen each other's identity. (pp. 12-13)

It is intriguing to trace how the impetuous and unbridled happiness of a baby's participation in an action song or a toddler's vocal dramatizing of imaginative play can be related to, and prepares the way for, a cultivated song or instrumental performance that recreates the experiences of an artistic tradition. Analysis of musical expression and cognition in infancy confirms that the art of music grows from needs to move that are inherent in all communication, including speech and language, dance, and drama. Fostering the child's sense of musicality is not the same as educating the child in the creations and techniques of the music culture, with its many different styles, techniques, and venues. The most successful teachers of music, who support pupils' discovery of the aesthetic universals and introduce the practice of a superior level of musical art, follow the child's natural musicality and share his or her appetite to know more about living and moving. Young children bring us back to the joyful source of all dynamic arts. Thus a composition by Mozart, for example, may be attractive and stimulating music for an infant, and could, conceivably, help learning of other non-musical skills, not because it is high art in the Western tradition, but because, like a happy mother, Mozart sings with natural and passionate genius.

Fostering the child's sense of musicality is not the same as educating the child in the creations and techniques of the music culture, with its many different styles, techniques and venues.

Musicality as the Texture of Memory for Adventure

Music does more than please us. It gives us an experience unfolding, a narrative without reference that feels

important. Poetry and song tell unforgettable stories. In all cultures, but especially those without writing, rhythm, rhyme, and melody are essential in rituals and in the telling of myths and legends. We all experience the exceptionally clear retention of simple repetitive tunes that we learned in childhood or at particularly moving times of life shared with those for whom we feel affection. In our research on the musical games parents share with infants we see evidence that a baby a few weeks old can learn to recognize a melody or dance ritual very quickly, and that one of an infant's earliest pleasures comes from recognizing the distinctive phrases and verses of a "favorite song" or tune, perhaps heard *in utero*.

In adolescence, the second most important period of learning in life, when new relationships are being found and the world invites us to explore and adventure, particular compositions of music and dance become a preferred medium of communication. The groups or stars that we choose to admire and share with friends confer the distinction of a social identity. This is also true among the cognoscenti of high musical art, who know intimately and love elaborate orchestral pieces, opera, or chamber music. In extreme infirmity or old age, a mother's or grandmother's song from our early childhood, a turn of notes in a favorite folk song, or a sentimental dance tune of our youth may be the last thing we can recall and evoke the last words we can speak.

One of an infant's earliest pleasures comes from recognizing the distinctive phrases and verses of a favorite song.

The Role of Musicality in Well-Being

Communication at the level of musicality in bodily expression has a fundamental role in the genesis of human well-being and the nurturance of "belonging" in a community. Maya Gratier (1999, 2001) shows that Indian mothers who have immigrated to Paris or California have less tuneful and satisfying speech with their infants than French mothers in Paris, American mothers in California, or Indian mothers in their villages in India. Evidently being out of one's native community and culture can make a mother less confident about simple expression of feelings to her baby.

We have described this human need for musicality as an aspect of social identity as follows:

> Early musicality has a powerful role in building memories. It marks with emotional signatures the identity of persons and ritual events. After very few months an infant can "make music," and seems to have found a proud performer's personality. Taken with the infant's clear preferences for particular companions, this musical "showing off" looks like the beginnings of his or her social identity as member of a group — a group with known habits, celebratory experiences and acting skills that are valued for the bonds that they represent and reinforce. Cultivation of intrinsic musicality is a way of declaring allegiance with a friend or to a social band. A newborn knows the mother by the tone and inflections of her voice. When a six-month-old smiles with recognition of a favorite song, and bounces with the beat, it is like knowing his or her name, displaying a social "me" within the family's affectionate pleasure of sharing. (Trevarthen, 2002, p. 21)

Participation in musical activity is also a lifeline for the emotionally distressed, whose relations with others have become compromised by loneliness, fear, or rage. Music therapy is a form of communication and mutual expression that can draw people together in privacy and give them a way to explore narratives of feeling that engender courage and joy (Trevarthen & Malloch, 2000). It can bring a child who is severely incapacitated by sensory or motor disability into companionship in thought and action, supporting language (Aldridge, 1996; Tønsberg and Hauge, 1996; Wigram and De Backer, 1999). Communities are strengthened by music and groups can support one another in difficult times by joining in dance and song.

We believe that music is therapeutic because it attunes to the essential efforts that the mind makes to regulate the body, both in its inner neurochemical, hormonal, and metabolic processes, and in its purposeful engagements with the objects of the world, and with other people. Music, with dance and all the expressive arts, offers a direct way of engaging the human need to be sympathized with — to have what is going on inside appreciated intuitively by another who may give aid and encouragement and share pleasures.

Investigating the Growth of Early Musicality and Developing Musical Culture

With appropriate methods of recording and analysis, the communicative behaviors of infants have cast light on the essential motivations of human minds and how they mature. We can measure precisely the natural tempos and morphologies of newborns' moving, knowing, and feeling. We can chart their self-regulated development and adaptive responses to parental care and teaching, and analyze the forms of parenting behavior that guide, or sometimes misdirect, their learning. Findings from observation and experimentation in the past 30 years have transformed our beliefs and explanations concerning what infants can do, know, and learn. The hitherto private world of mothers' play with their preverbal sons and daughters has proved to be rich in information for psychological science (Trevarthen, 1998; Trevarthen & Aitken, 2001).

Babies are born with musical readiness, and older people find pleasure in fostering it (Trehub et al., 1997). Mothers' lullabies, and the playful songs mothers and fathers use to accompany action games for young children with finger-walking, clapping, bouncing, and jumping routines, are traditional. They may be preserved for centuries and shared across many lands in many languages. The magical and mysterious poetry of nursery rhymes serves both mothers' needs for dreaming and consolation and babies' needs for harmonious communication. We can think of parents' performances of baby songs as supporting a Vygotskian Zone of Proximal Development of musicality, "scaffolding" the musical pulse, giving it time frames to climb in, and gestural swings for the child's motor imagination to grow in power and skill, as well as in shareable meaning (Vygotsky, 1986). Step by step, the infant grows in understanding of the world that can be shared in mimesis, metaphor, and speech.

Stages in the Development of Musicality

The newborn. A newborn absorbs the mood or atmosphere of a mother's gentle sounds, listening to a peaceful musical recording, or the hum and rhythm of convivial conversation. The day's routine of waking, nursing and sleeping can be framed in musical accompaniments. Tiny infants, even those supported in a Neonatal Intensive Care Unit (NICU), can appreciate and learn music and songs that are not too vigorous or aggressive. Babies at risk due to their prematurity, developmental disorder, or trauma can be sustained and helped to grow in strength and health by peaceful music, especially in intimate communication with the body of a caregiver (van Rees & de Leeuw, 1987). They withdraw and protest if the narrative of sound is too forceful, startling, or harsh. Very young brains need calm for their intense development and for self-regulation of bodily states. Moments of alertness and curiosity can be stimulated in fragile babies using the rhythms of IDS, song, and instrumental melodies, but these infants cannot tolerate threatening noise. The enjoyment a parent experiences in giving musical comfort to a baby can also be experienced by NICU staff when a musical environment provides a haven of peace and rest (see Standley, this issue).

A newborn absorbs the mood or atmosphere of a mother's gentle sounds, listening to a peaceful musical recording, or the hum and rhythm of convivial conversation.

The first year. Within a few weeks of birth, a baby can take more alert interest in the music of a mother's speech and join in actively, encouraging her to more lively play. The second and third months are a time of rapidly developing companionship between infant and caregiver, a mother's musicality being especially appreciated. The protoconversations and motherese speech that parents and infants share have the patterns of rhythm, melody, phrasing, and narrative we have described as essential in communicative musicality. This is clearly a start of "learning how to be musical" in the ways of other older people. It is also a time for mother-and-baby groups to develop kinds of play where the infant is more than a listener and learner.

The infant who is a musical playmate quickly gains in boldness and sense of humor, rewarding the lively routines of action games with joyful calls, imitations of musical fragments, laughter, and exuberant movements of the body, arms, and legs. Now infants, given the chance, can look to a number of people, including siblings, for company. The family becomes a much closer and more animated musical group or "band."

The exuberance of musical games in mothers' and babies' groups shows how music and movement foster the spontaneous enjoyment of community. As the mothers play, sing, and dance with their infants, they reaffirm that their babies are emotional, interactive, and communicative. They experience their babies in immediate relationship to their own moving bodies and singing voices — a relationship that is always available, but that can be lost sight of in a culture that does not value time just "hanging out" without a particular goal or achievement in mind. The value of such musical games can be seen in mothers' very positive assessments of the time spent in musical play with their infants, their reporting of their own and their infants' enjoyment, and their own increased appreciation of their infants (Vlismas, Malloch, & Burham, 2002). The bonds of friendship between mothers grow as well, and they are happy to share the discoveries of their children with one another .

By the middle of the first year, babies can stimulate one another to join in collaborative rhythmic games of toe-pointing, leg-wagging, and arm-waving, accompanied by a variety of calls, crows, and babbles (Fiamenghi, 1997; Trevarthen, Kokkinaki, & Fiamenghi, 1999). Babies are naturally sociable creatures and intensely aware of one another's feelings and expressive inclinations. The musical culture is beginning to be something that can grow with peers and older child playmates, not just with parents or adult caregivers.

The 6- to 9-month-old. Babies at this age have a performer's self-consciousness and show gleeful pride in accomplishment that is sensitive to others' appreciation. With strangers, who may not share the mini-culture of the family, the baby may find contact difficult and mutually embarrassing. It may even precipitate intense shame, avoidance, protest, and calling for a mother's attention. The ego of the infant musician must be treated with gentle consideration at this very fertile time, when the new opportunities

for sharing musical and dancing play are opening up, and celebrations of expressive games are being felt in a new way. This is the threshold of true music-making.

The 1-year-old. A 1-year-old can be trained to perform entirely acquired skills. Toddlers can retain a learned ability to move in strict tempo for an extended performance "in time" with a musically skilled partner; start to sing a melody with accurate control of pitch; and begin to retain and practice a little piece of music for voice or a sound-making instrument. But for most babies, the enriched musical experience of this time is not so disciplined, and the creative inventiveness of musical jokes and games that tease movement and attention, such as "peek-a-boo," are quite enjoyable enough without training that looks toward an education in music. The most supportive action is to encourage the baby's love of musical company by being part of it.

Older toddlers. In the second and third years, awareness of invented musical activities increases to the point where the toddler can be an interested mimic and participant in the activities of a musical family and community. In cultures where song, instrumental music, and dance are part of everyday community life and where most adults enjoy being performers in some measure, toddlers are attentive and seek to imitate. They love to be involved in the bodily expression of pleasure in music, and they begin to create joint expressions of a sense of music with peers, taking up one another's rhythmic inventions and copying melodic lines of vocalization. The development of language leads to recitation of nursery rhymes and simple poetic narratives, and toddlers' performances are enhanced by musicality — the expressive time, harmony of rhymes, and melodious variations of pitch.

The appreciation of music by a 3-year-old will be a source of pleasure and pride for siblings as well as for parents and grandparents. Soon the child will imagine being a singer, dancer, or TV character, or will proudly show off "performances" with instruments that easily make musical sounds when banged, plucked, shaken, or stroked. This exercise is quite different from pushing a button to activate a musical toy that automatically repeats a melody. It is the active creation and discovery of human-made musical sound that communicates.

The Birth of Language: Catching the "Point" of Words in Narratives of Intention

Lev Vygotsky (1986), Jerome Bruner (1983), and John Locke (1993) all have emphasized that a child picks up language by noticing what other people do with it. Acts negotiating social participation with emotion come earlier in development leading to language than intention-directing "proto-imperatives," just as "person-person games" came before "person-person-object games" in the middle of the first year (Trevarthen & Hubley, 1978). At the early stages, learning grammar is not simply a matter of coordinating vocalizations with intentions and attentions — requesting, pointing, showing, and giving. It involves concern for human feelings and sensitivities, and for the forms of expression that form the underlying texture of all live communication and "experiencing together." An "experience expectant" speech awareness helps a newborn learn phonological and prosodic features of the mother tongue. The affectionate tone and intonation of parental speech claim the infant's attention and give meaning to their engagement. The acquisition of skills for hearing the important features of a language starts early in the first year, even though the production of words comes much later.

Research on baby songs in several languages confirms that they give a special guidance towards the speech in the "mother tongue," guidance that is eagerly sought by infants. The rhythms and phrasing of a traditional baby song form a framework for the placing of vowel sounds and rhymes, and the melody is like a story of feeling that has moments of clear definition where the distinctive sounds of the language can be easily grasped. As previously mentioned, Daniel Stern (1993, 2000) has described the mother's speech as creating "dynamic narrative envelopes." We follow his inspiration and call the melodious speech and song "emotional narratives." Interestingly, the primary phonological distinctions between languages and dialects of languages reside in the rhythms and vowel sounds, features for which infant hearing is innately adapted. Research with newborns has indicated that even at this stage, a baby is listening for the kinds of distinctions that linguists use to define stress-timed and syllable-timed languages.

Infants play and sing with emotional, musical narratives long before they talk, and toddlers create dramas with voice, gesture, and action. Jacqueline Nadel shows how the pleasure and trust that infants experience in relationships with members of their families quickly transfer to communication between toddlers (Nadel & Pezé, 1993). She has recorded 18-month-olds using immediate imitation of actions and utterances for nonverbal negotiation of purposes and for sharing meaning. She has also observed toddlers signaling their humor and pleasure in sharing by exuberant gestures and vocal prosody.

Musicality is close to the emotional source of interest that leads children to learning their culture's language and work. We emphasize this motivational and emotional foundation of learning because Western psychology tends to reduce intelligence to cognitive mastery of physical structures of experience and what are assumed to be arbitrary inventions of human constructive cleverness. Human learning depends on the musicality derived from the ways the body moves instinctively to get experience and from the sympathy we immediately have for one another's purposes and emotions, expressed in the timing and quality of our movements. When we listen to music, we can hear the impulse for knowing and understanding, and we know we can share that impulse.

Musicality and Emotional Companionship

The evidence from early infancy suggests that emotion shapes reason. What Daniel Stern calls the "relational emotions" — which are specifically adapted to real-time regulation of the balance of initiatives and reactions between persons, determine relationships of affectionate attachment, trust, and companionship; and defend against abuse, mistrust, and disregard — are fundamental to the ecology of emerging human consciousness. It follows that emotions often described as "complex," "non-basic," and "acquired" are, in fact, *primary* and *necessary* to the child's entry into the social/cultural world (Draghi-Lorenz, Reddy, & Costall, 2001). As Stein Bråten (1992) argues, such feelings, and their expressions, have foundations in dynamic reactions of even young infants to the feel of "being present" with an "other," receptive to their changing appraisal.

Infants are adapted to live emotionally by what Barry Barnes (2000) calls "understanding agency" in human society — that is, the dynamic balance of pride against shame that regulates negotiations and that gives value to all contractual obligations. Barnes adopts the same approach to human sentiments as did Adam Smith (1759), who, drawing on a rich Scottish philosophical belief about human nature, identified in each of us the capacity for sympathy and for developing a conscience that will appraise disinterestedly what we do and think about doing. Cognitive abilities, categories of thought, and declarative memories are all motivated by the human need for sympathy in agency.

The link between musicality and emotions is clear in sad and confused states of mind, as well as in the joyful pride of shared actions and experiences.

The link between musicality and emotions is clear in sad and confused states of mind, as well as in the joyful pride of shared actions and experiences. We have long been interested in the effects of broken or unsympathetic adult responses on infant's emotions. Even in the early weeks, a baby is very sensitive to the tone and reactivity of another person's speech. If a mother does not react with precisely attuned rhythms of speech and facial expression, a 2-month-old becomes withdrawn and distressed. A mother with postpartum depression may find it hard to provide attuned responses to her baby. Her speech becomes discordant and unpredictable. More specifically, Louise Robb (1999) has found the depressed mother's speech to be pitched lower than that of healthy mothers. It lacks rhythmic regularity and gives the infant little chance for musical participation.

The Intimacy of Motives in the Evolution of Art and Culture: Why Musicality Is Important

All our explorations of the musicality of an infant's life in human company confirm the idea that free and sympathetic expression of what we call the Intrinsic Motive Pulse (IMP) of moving and feeling is necessary for development of the mind and for emotional health (Trevarthen, 1999). That is why music has a unique and permanent value for education, and why musical communication can be such powerful therapy. All the wonderful creations of musical artists and performers come from the same inborn source in human nature, which psychological science is just beginning to perceive.

Two talents, evolved from the rich and agile social intelligence of apes, transformed primate intelligence, making it human and cultural. These are a peculiar polyrhythmic restlessness of gesture of a bipedal actor, and a new conversational intimacy of expression in communication (Trevarthen, 1999). Both talents are evident in the innate, generative form in the mobile bodies and playful pretensions of infants and toddlers everywhere. The first frees the mind to spin extravagant, imaginary projects of action and emotion without the call to carry them to consummation. The second invites shared imagining and the creation of an infinite array of knowledge and skills through collaborative storytelling and the building of artifacts. A transgenerational fabric of culture with elaborate beliefs, celebrations, and constructions sets out different social roles for human individuals in a community, giving rise to identities and personalities that are owned with pride and lost with shame. A new morality and a new sense of group affinity arise within families and communities. The collective narrative, first told through myths and legends, develops in societies into systems of practical duty, religious belief, and obedience to laws. The young become educated because they want to understand what culture means, and because their elders wish to teach what they know and can do. These are the reasons we should agree with Ian Cross (1999) that music is "the most important thing we ever did."

Merlin Donald (2001), with his theory of the priority of communication by "mimesis" in evolution of the human mind and the "collective consciousness" of talk, has made us aware that language and all it represents was only possible with the human body's new flexibility in movement and the metaphorical human mind — and because the intrinsic pulse of human movement is so faithfully and instantaneously mirrored between persons of all ages. Human minds mirror one another's motives and feelings even before humans know how to speak. Using this talent, humans create symbols in many spoken and unspoken forms that can specify shared ideas with precision and combine them in infinitely varied ways.

All the inherent and acquired attributes that are unique to humans, and that have stronger anticipation in all children than in young animals of other species, relate

to the making and living of an inter-mental existence. It is the motive for cooperation in what Donald (2001) calls "mythic culture" that makes us different, and capable of developing more practical technical, or "paradigmatic," intelligence.

An Invitation to Parents and Caregivers

Music moves everyone, everywhere—even the newborn infant. Music can be enchanting, calming, thrilling, comforting, or frightening. We need to understand better and appreciate the fundamental musicality that all humans possess, and its power to communicate, to bring people together. The music we *cultivate* — the high-art music of concerts, opera, and ballet; the traditions of folk music; and the rich improvisations of jazz — has its source in forces of moving and awareness that reside in our human nature. These forces provide babies and young children with a bridge of communication, experience, and learning from birth, or even before birth — long before language and reasoning are taught in school, and long before formal instruction in music. The forces of moving and awareness can also transform the adult, with love and enjoyment, into a playmate, releasing intuitive impulses to move and sing in ways that engage and support the child's expressions.

We invite parents and teachers of infants and toddlers to focus on the intuitive *motives* that make music attractive and pleasurable to the human spirit — that make children happy to express themselves in musical ways before they have any musical instruction, and that make music communicable and a source of inspiration and emotional fulfillment.

Sophisticated musical performance demands a facility that only a minority of gifted and dedicated young people can truly master. But *enjoyment* of music and the ability to create musical sound are talents we all are born with. How else can we explain the musical discriminations and preferences of infants? Babies are totally naive about musical culture, yet they hear the sounds of music well. They interact skillfully with much music and song, expressing recognition and pleasure in its discovery. And how can we explain how adults and siblings spontaneously make musical sounds that attract babies — how they can talk baby talk and sing nursery songs with the same rhythms and melodious forms of expression across different languages, almost as if they are being taught the universal principles by the babies?

Musical education is more than nurturing a tradition. It is celebrating, in various intricate manners, what is at the simple core of human vitality and companionship. Musicality is the carrier of feelings, purposes, and interests that animate the learning of meanings in language. That is why it is so rejuvenating for an adult who has become a parent, or for any teacher of infants and toddlers, to share musical fun with children.

All humans, from the very moment of birth, wish to communicate and share experience. The human ability that makes this communication possible from the beginning of life is the same ability that creates symphonies, dance, and poetry. It is human musicality. 𝄞

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MOTHERS ARE MUSICAL MENTORS

SANDRA E. TREHUB
University of Toronto, Canada
sandra.trehub@utoronto.ca

PHOTO: MARILYN NOLT

Babies come equipped with exquisite sensitivity to the musical features that are common across cultures. They are remarkably skilled listeners, their memory for music is adult-like, and they are keenly interested in music. Intuitively, mothers in all parts of the world cater to these interests and inclinations by providing informal musical mentoring. They do so selflessly, motivated by love and a desire to communicate with their preverbal infants. These notions about infants and mothers may seem like wild speculations, but they are based on findings from systematic studies of infant music perception and musical interactions between mothers and infants. This article outlines the evidence for the musical nature of infants and mothers and considers the implications of this knowledge.

The Listening Skills of Adults and Infants

One way of appreciating infants' musical proficiency is to compare their music-listening skills with those of adults. Adults, even those without musical training, are proficient music listeners (Dowling, 1999). After hearing an unfamiliar melody, they remember its pitch contour and rhythm (i.e., a rough gloss of the tune), but they forget precise details such as pitch distances between notes (i.e., musical intervals), specific pitch levels, and note durations. For melodies heard repeatedly over months (e.g., popular songs) or years (e.g., "Happy Birthday"), their memory is much more precise. For example, adults readily detect errors in amateur performances of sung or instrumental music, and they often notice errors in professional performances.

Along with adults' excellent memory for familiar musical pieces is a generalized or abstract conception of those pieces. For example, their recognition of a familiar tune does not depend on a specific pitch level, a specific tempo (or speed), or a specific instrument (e.g., a piano, flute, or voice). What matters are the relations between notes, which define the tune as "Yankee Doodle" rather than "Happy Birthday," "Twinkle, Twinkle, Little Star," or anything else. For many years, scholars believed that previous experience with different renditions of a tune taught us which features are critical to the identity of that tune (e.g., pitch relations and rhythm) and which are not (e.g., exact pitches and note durations). However, research with infant listeners overturned traditional views about music listening and added substance to the claim that music has biological foundations (Trehub, 2000, 2001).

Our knowledge about infants' musical skills would be minimal were it not for the innovative test procedures in current use. In one procedure, 6-month-old infants learn to turn toward a loudspeaker whenever they hear a change in the background melody, and are rewarded with visual treats whenever they do so (Trehub, Thorpe, & Morrongiello, 1987). If infants respond consistently to a particular change, it tells us not only that they noticed the change, but also that they remembered what the original melody sounded like. Another procedure allows researchers to learn about infants' musical preferences by measuring signs of interest and attentiveness while they listen to different musical selections (Trainor, 1996).

at a glance

- Infants prefer the musical qualities of infant-directed speech to adult-directed speech. Babies respond better to infant-directed sign language than to adult-directed signing.
- Maternal singing captures infant attention better than maternal speech.
- Mothers produce playful or soothing renditions of familiar songs to regulate their infants' states, and possibly their own.
- Infants' ability to grasp musical patterns is adult-like, and may have biological origins.

Well before infants understand anything about language, they can recognize a recently heard melody or auditory pattern (i.e., sequence of pitches), even when it is presented at a different pitch level (Chang & Trehub, 1977a; Trehub, Thorpe, & Morrongiello, 1987) or tempo (Chang & Trehub, 1977b; Trehub & Thorpe, 1989). Infants' attention to musical detail is truly impressive. After mere minutes of listening to a melody, they detect subtle changes in pitch (Trainor & Trehub, 1992; Trehub, Bull, & Thorpe, 1984) or rhythm (Trehub & Thorpe, 1989). What surprised everyone, however, was infants' especially keen memory for melodies that sound conventional or ordinary to adults. For example, infants remember extraordinary detail from melodies with consonant, or pleasant-sounding, intervals (e.g., perfect fourths or fifths) and those with regular timing (i.e., a steady beat). By contrast, they remember little from melodies with dissonant intervals or irregular timing (Schellenberg & Trehub, 1996; Trehub, 2000). In this respect, they are very much like adults.

Nature provides infants with the ability to appreciate the music of any culture.

I am not suggesting that 6- or 8-month-old infants have learned the musical conventions of their cultures. Instead, *nature* provides them with the ability to appreciate the music of any culture (Schellenberg & Trehub, 1999; Trehub, 2000, 2001). The implication is that music everywhere, especially folk or popular music, reflects the capabilities and constraints of the human auditory system.

Beyond the perceptual parallels between infants and adults are interesting aesthetic parallels. In general, adults prefer music with consonant intervals to music with dissonant intervals. How interesting it is that infants, in their own way, make comparable judgments! For example, 4-month-olds are more fretful and restless when they listen to dissonant versions of European folk melodies than to the original consonant versions (Zentner & Kagan, 1996). Similarly, 6-month-olds prefer intact Mozart minuets to modified versions that substitute dissonant intervals for many of the consonant intervals (Trainor & Heinmiller, 1998).

Music in Mothers' Speech: Babies' Reactions

It is reasonable to wonder whether these music-listening skills are useful to infants. As it happens, mothers regularly produce music or musical sounds for their babies. They talk a great deal to infants, and their sing-song speech is repetitive, rhythmic, and dominated by flowing pitch contours (Fernald, 1991). Moreover, caregivers across cultures use similar intonation contours in similar contexts — for example, rising contours to attract infants' attention; smooth, falling contours to soothe infants; and abrupt, flat contours to discourage undesirable behavior (Fernald, 1991; Papousek, 1992). In short, vocal, non-verbal aspects of mothers' speech are emotionally interpretable (see Ferruled, 1991).

Deaf mothers achieve comparable expressive goals through very different means. Their signed messages to infants are more rhythmic, repetitive, and emotionally expressive than are their signed messages to adults (Masataka, 1992). Just as infant-directed speech has parallels with music, so infant-directed signing has parallels with dance. In other words, verbal and signed communications to infants provide similar emotional information.

In general, mothers use a small set of intonation patterns or tunes when talking to their pre-verbal infants, and they fill such tunes with an assortment of verbal phrases (Bergeson, 2002). For example, they pose numerous questions, most of which end with a rising pitch: "Do you want to eat now?" "Should I change your diaper?" "Are you my special baby?" "Should we ride in the car?" Fine-grained analyses of maternal questions and statements reveal distinctive pitch patterns on the part of every mother (Bergeson, 2002). In effect, distinctive voice quality, tunes, and facial features provide multiple cues to the mother's identity in light or darkness.

How do babies respond to their mothers' "spoken music"? Newborns and older infants are more attentive and responsive to the sounds of infant-directed speech than to those of adult-directed speech (Cooper & Aslin, 1990; Fernald, 1985; Werker & McLeod, 1989). Essentially, they prefer happy-sounding speech to neutral-sounding speech (Singh, Morgan, & Best, 2002). Similarly, infants show greater attention and more positive affect to signed infant-directed messages than to signed adult-directed messages, whether or not they have experience with sign language (Masataka, 1996, 1998).

Maternal Singing: Babies' Reactions

Maternal vocal interactions with infants are not limited to speech or playful noises (e.g., clicks, raspberries). Mothers throughout the world sing regularly to infants in the course of child care (Trehub & Trainor, 1998). Historical accounts indicate that caregivers, whether mothers, fathers, grandparents, siblings, or nannies, have always engaged in such singing. Maternal singing to babies differs from typical informal singing in its greater emotional expressiveness, higher pitch level, and slower tempo (Trainor et al., 1997; Trehub et al., 1997). Although fathers sing far less frequently to infants than mothers do, their singing is also marked by heightened emotionality (O'Neill, Trainor, & Trehub, 2001; Trehub et al., 1997). Even preschoolers sing more effusively than usual when their infant sibling is in view (Trehub, Unyk, & Henderson, 1994). The presence of a baby seems to influence the emotions of caregivers or bystanders, one consequence of which is highly expressive singing.

Most mothers have a small repertoire of songs that they sing repeatedly to their infants. One might expect mothers to vary these renditions, but they produce highly similar performances. For example, when mothers sing their favorite

nursery song to infants on different occasions, they maintain the same pitch level and tempo (Bergeson & Trehub, 2002). Such monotony would likely bore the adult listener. For the infant, however, stable performances provide a source of security — a familiar voice, a familiar performance style, and a familiar song. As one would expect, mothers adjust their performances to respond to their infants' changing states, producing playful or soothing renditions, as appropriate. In other words, mothers tailor their performances to the needs of their young listeners.

Singing and speech are important means by which mothers share emotions with their pre-verbal infants. Such emotion-sharing can be accomplished even with infants' limited range of social-emotional skills. Infants are sensitive to socially significant visual and auditory stimuli. For example, they are attracted to faces (Johnson, Dziurawiec, Ellis, & Morton, 1991) and to voices (Ecklund-Flores & Turkewitz, 1996) from the earliest days of life. They are also precocious social learners, as reflected in their recognition of mother's face (Bushnell, Sai, & Mullin, 1989) and voice (DeCasper & Fifer, 1980) soon after birth. Before infants can understand specific emotional meanings, they succeed in mirroring mothers' emotions by a process of emotional contagion (Hatfield, Cacioppo, & Rapson, 1994). Just as infants cry upon hearing the crying of other infants (Hoffman, 1978), they attain positive affective states simply by hearing a mother's expressions of positive emotion.

Even as newborns, babies are more attentive to singing in the "maternal" style than to typical informal singing (Masataka, 1999), and this preference persists during subsequent months (Trainor, 1996). No doubt, vocal cues to positive affect underlie this preference, as they do for infant-directed speech (Singh et al., 2002). In everyday life, maternal singing provides visual, tactile, and movement stimulation in addition to auditory stimulation. Videotaped (i.e., audio-visual) versions of maternal singing generate exceptional interest, even greater than that shown for videotaped episodes of maternal speaking (Nakata & Trehub, 2000). Infants' engagement during the singing episodes is evident from their prolonged regard of the mother's on-screen image and from dramatic reductions in their body movements. Videotaped singing performances of unfamiliar singers (the mothers of other infants) are also effective in maintaining infants' attention (Nakata & Trehub, 2001).

Maternal speech readily captures infant attention, but maternal singing is more effective in maintaining attention. Maternal singing also reduces infant arousal (Shenfield, Trehub, & Nakata, 2002). The success of singing in regulating mood and arousal may account for its prevalence in child care settings across cultures and historical periods (Trehub & Trainor, 1998). Mothers' use of music to manage infant moods has parallels in the therapeutic use of music for regulating emotion in disabled or sick children and adults (Bunt & Pavlicevic, 2001) and to adolescents' self-regulation of moods by music-listening (Sloboda & O'Neill, 2001).

Maternal singing may well provide benefits for the singer as well as the listener. Throughout history, informal singing has been used to ease the burden of manual labor (Keil, 1979), relieve the pressures of daily life (Cong-Huyen-Ton-Nu, 1979), foster closeness between singer and listener (Pantaleoni, 1985), and provide a safe outlet for negative feelings (Merriam, 1964). Caring for infants involves stresses as well as pleasures. The privacy of mother-infant interactions and the pre-verbal status of the infant make it possible for the mother to say or sing what she could not express in other contexts. Releasing pent-up feelings may increase the mother's feelings of closeness to her confidante. Soothing singing likely calms mothers as well as infants, and playful singing likely rouses them both. In this way, maternal singing can regulate maternal as well as infant emotions.

Implications for Infant/Family Practice

If singing to a baby is beneficial to mother and child, surely practitioners who work with infants, toddlers, and their families should urge every mother to sing to her infant. Surely they should encourage mothers to produce highly expressive performances. Or should they? The available research offers *descriptions* of what most mothers do when interacting with their infants, not *prescriptions* for what mothers *should* do. Moreover, deliberate, planned performances are unlikely to have the emotional richness of spontaneous performances, which are motivated by sensitivity to the infant's changing needs. Just as sensitive mothers adjust their communications to the needs of infants, so sensitive practitioners must fine-tune their interventions to the unique needs of each family.

Commercial Recordings and Music Lessons

Media reports about infants' musical abilities and potential have convinced many mothers that "good" (i.e., professional) recordings are preferable to their own mediocre singing. Such recorded materials, interesting as they may be, are designed to attract the adults who buy them. They are no match for maternal performances, which feature interesting sights and movements as well as sounds. Moreover, commercial recordings lack the familiar voice and emotive qualities that are so engaging to the infant listener, and they are not tailored to the preferences of individual infants, as mothers' performances are. No one would suggest replacing maternal verbal interactions with recorded monologues or dialogues by professional actors. By the same token, professional singers are no substitute for live, maternal singing.

The recent media frenzy surrounding controversial claims that music training increases brain power has also fuelled unparalleled interest in music programs for moms and tots. Although music programs for older children may be highly valuable, such programs are by no means necessary for mothers and infants. However, parent-centered programs can connect mothers or fathers with other parents, encourage playful inter-

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actions with infants, musical or otherwise, and provide parents with a repertoire of enjoyable musical activities. By contrast, instructor-centered programs often take the joy out of music by their authoritative (or authoritarian) pronouncements on the "right" music, the "right" activities, and the "correct" developmental timetable of musical exposure and training.

Conclusions

Infants' precocious listening skills, musical memories, and responsiveness to music attest to their musical natures. Mothers complement these skills by providing extraordinary musical mentoring from the earliest days of life. Unlike musical mentoring by professionals, maternal mentoring is intuitive and selfless, guided by love and concern for infants rather than profit or musical goals. If infants are musical, then surely mothers are, too.

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MUSIC THERAPY IN THE NICU:

Promoting the Growth and Development of Premature Infants

JAYNE M. STANDLEY, PHD, MT-BC
The Ella Scoble Opperman Professor of Music
Center for Music Research, The Florida State University
jayne.standley@cmr.fsu.edu

PHOTO: BARBARA YOUNG, M.D.

Growing knowledge of how to encourage the healthy development of low-birth weight, preterm infants has led to individualized, family-focused developmental care in many neonatal intensive care units (NICUs) across the country (Als, 1992). Nevertheless, some aspects of the NICU environment remain extremely aversive to the preterm infant, especially ambient noise levels caused by medical machinery and alarms. A preterm infant in the NICU is deprived of the sensory experience of the womb: the sound of her mother's voice and heartbeat; the contrast between the sounds of day and the quiet of night; and common ambient noise such as music, which is not commonly found in intensive care settings. Medical treatments for the severely premature child are far more advanced than developmental ones, but mounting concern about long-term outcomes is placing emphasis on safe, effective early intervention in the NICU. Music is a noninvasive, nurturing stimulus that can be used therapeutically to mitigate some of the aversive features of the NICU environment and to accomplish developmental and medical objectives throughout the infant's hospitalization.

Music therapy researchers have identified four primary techniques that promote growth and development in premature infants in the NICU. We use music to do the following:

1. Mask ambient noise and reduce stress.
2. Promote physiological well-being and stability.
3. Benefit neurological maturation and improve tolerance to stimuli.
4. Reinforce behavioral change.

This article will describe this research and discuss a recent meta-analysis of the effects of music-based developmental interventions with premature infants in the NICU.

Music to Mask Ambient Noise

Ambient sound exists in an environment without a listener's ability to control volume, duration, location, or to

at a glance

- Music can be used to offset some aspects of the NICU environment that can hamper development in preterm infants.
- In a recent study, playing lullabies significantly reduced length of stay and increased weight gain for 52 preterm infants.
- Music in the NICU can improve sucking rates (related to successful feeding), increase oxygen saturation, and support homeostasis for preterms.
- Techniques for using music with preterm infants have been tested in randomized controlled trials.

pair it with its origin. Such noise, unlike music, is full of irregular frequencies and inconsistencies of tension, stress, and configuration. These unpredictable characteristics can produce fatigue and stress in the listener, especially when the listener is a premature infant with an immature neurological system. Moreover, the sounds of ventilators and incubators in an NICU can mask the frequencies of the human voice. As a result, premature infants miss important auditory processing opportunities that they would have had in the womb. Carefully chosen music can mitigate these problems to some extent.

Researchers have long been aware of the benefits of acoustic music to human well-being. Music therapy researchers theorized that music in the incubator would reduce stress and enhance the growth of premature infants. When Caine (1991) formulated the initial research, music therapy literature contained no precedents exploring various types of music, lengths of exposure, or appropriate decibel levels for premature infants. Caine made selections based on audiological research demonstrating that newborns habituate to continuing sound but are alert to new auditory stimuli, and that lullabies from all cultures have a melodic, harmonic, and rhythmic consistency that soothes term infants.

Researchers screened and selected lullabies for lack of complexity and consistency in instrumentation and style. The lullabies were the same for all babies in the experimental group and were delivered via a small tape recorder placed inside the incubator at the feet of each child. The decibel level was set at 70dB on Scale C.[1] Subjects were 52 preterm and low–birth weight infants assigned to experimental or control groups matched for gender, birth weight, and diagnostic criticality. The musical stimuli were provided from the time the experimental infants graduated from the radiant warmer to an incubator on the intensive care side of the nursery, and continued until discharge to the intermediate care side. Music played continuously for 1½ hours within a 3-hour time span, alternating 30 minutes on with 30 minutes off. Results showed that music indeed promoted growth and development. The music stimulation significantly reduced initial weight loss and length of NICU stay, and increased daily weight gain and caloric intake. The experimental infants were, on average, discharged 5 days sooner than the control babies, and researchers observed significantly fewer stress behaviors.

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Other studies followed comparing NICU length of stay with music provided via headphones or free-field throughout the NICU; with conditions contrasting music with other sound stimuli; with earmuffs muffling harmful stimuli; and with music played at very high (85 dB) and very low (35 dB) levels. In 1998, Cassidy and Ditty summarized the NICU music research using recorded music, and analyzed decibel levels and mode of presentation of sound stimuli. Their recommendations remain the standard for music provision in the NICU: that music between 65-70 dB (Scale C) seems most effective; that volume levels should be assessed at the infant's ear, not at the sound source; that music should be presented binaurally; and that caregivers must reduce dB levels if headphones seal around the pinna, since the infant's tiny ear canal will augment dB levels.

Music to Promote Physiological Well-Being

During Caine's research, we informally observed that music seemed to facilitate oxygen saturation and that the respiratory therapist often reduced the amount of oxygen provided to infants listening to music. We also observed that the frequency of oxygen saturation and apnea alarms was reduced during music listening. We then realized that physiological responses to music as well as growth factors should be evaluated. We were also aware that the previous research had contrasted music solely with ambient sound in the NICU. DeCasper and Fifer's research documenting newborns' recognition of their mother's voices (1980) suggested this might also be a powerful stimulus for soothing the infant and reducing stress. We designed a study to contrast the effects of listening to music versus listening to a mother's voice on oxygen saturation (Standley & Moore, 1995). We wanted to tape the mothers singing to their babies for this study, but were universally refused: mothers agreed to be taped reading to children but not singing. We again screened lullabies for consistency in musical characteristics and juxtaposed them into 20 minutes of continuous music with no periods of silence between selections. We then taped each mother reading or talking to her child for a 20-minute interval with no periods of silence other than the momentary pauses at the ends of sentences. Subjects were 20 premature infants placed in radiant warmers or incubators who were receiving oxygen via nasal cannula or ventilator. Ten participants listened to music, and 10 infants matched for gender, age, and weight each listened to the mother's

1 The human ear does not respond equally to all frequencies. Scale C, a decibel meter-weighting scale, measures a wide spectrum of frequencies and is more sensitive across the several octaves used in music stimuli. Scale A of the decibel meter filters those frequencies common to human voice production and is used to measure speech. There is approximately a 10 dB difference between the Scale A and C measurement of the same sound, with C registering the higher dB level. When discussing sound in the NICU, it is important to indicate on which scale the auditory stimulus was assessed.

voice. Each auditory stimulus was played for 20 minutes on each of three consecutive days with 10 minutes of observation before and after auditory presentation. Auditory stimuli were presented individually via earphones with a range of 65-70 dB. Results showed that music immediately increased and stabilized the infants' oxygen saturation levels, which were significantly greater than those of the mothers' voice group. The frequency of oximeter alarms was significantly less for the music group. Babies listening to a mother's voice did not have significantly increased oxygen levels until the third day.

During this study, we noted that oxygen levels for the music babies were slightly depressed during the 10 minutes following music stimulation. We theorized that the abrupt termination of music, which had been affecting oxygen saturation so well, must be disquieting, and wondered if a pattern of alternating, brief periods of music fading in and out might sustain pacification. We designed a study of 5 segments, each of 4 minutes of silence, alternating with 4 segments, each of 4 minutes of music (Cassidy & Standley, 1995). Subjects were 20 premature infants from 24 to 30 gestational weeks observed during the first week of life, and were divided into experimental and control groups, each balanced with regard to age, weight, and gender. The segments were presented individually via earphones for 3 consecutive days. Results confirmed that music significantly increased oxygen saturation levels on Day 1. Graphed data across the 36 minutes of data collection for each of the 3 days showed that the introduction of music immediately increased oxygen saturation levels and maintained them throughout the observation period. No decrease in oxygen saturation levels followed the cessation of music. Heart and respiration rates were also noticeably higher during music. These studies demonstrated that music's effects are immediate on measures of physiological well-being; that music is not contraindicated for even the youngest premature infants in the NICU; and that the dB levels, presentation mode, and duration of music presentation must be carefully controlled to be most effective.

When the mother or music therapist is present, individually directed, culturally appropriate singing or talking is preferred over recorded music.

Other studies began to isolate the effects of different types of music versus other auditory stimuli. Moore, Gladstone, and Standley (1994) contrasted music with white noise, ambient sound, and mother's voice, and found all auditory stimuli to be an improvement over the ambient sound in the NICU. Coleman and colleagues (1997) contrasted a female vocalist with a male vocalist and found no difference in physiological responses by gender. In all these studies, music functioned to significantly improve measures of physiological well-being.

Following the physiological series of studies, we developed guidelines for the selection of recorded music appropriate for the NICU, which are used to design clinical music therapy and research protocols:

- Initially, when the infant is very young, use the same selection for greatest pacification. Later, use a variety of selections to develop auditory processing skills.
- Use the human voice — especially that of the mother, to promote bonding — for development of language. Very premature infants have not had the opportunity to hear a mother's voice daily in the womb and need opportunities to learn to recognize one. When the mother or music therapist is present, individually directed, culturally appropriate singing or talking is preferred over recorded music. Live musical interactions promote language-based bonding.
- Erratic auditory stimuli are rousing; therefore, recorded or live music in the NICU should be soothing, constant, and relatively unchanging. Non-rousing music will contain the following: one voice alone, or only 1 accompanying instrument; light rhythmic emphasis; steady rhythm; steady volume; and melodies in the higher ranges, which infants hear best. Major keys are less disquieting than minor keys. Music therapists should consult with parents and make efforts to obtain or record appropriate arrangements of their preferred music.
- Musical toys and mobiles are almost always contraindicated. They provide sounds or melodies of short duration that are repetitive; often volume cannot be controlled; and their sound cannot be localized. They can add ambient noise to other infants' environments, and frequently sound quality is poor.
- Music should be presented individually and binaurally. Volume should not exceed 70 dB. Care must be taken to set the loudness level individually to meet the readiness level for each infant, the logistics of his/her care environment, and to assure that nearby infants are not disturbed. For this reason, unit-wide, free-field music is not recommended.
- Infants can begin to listen to recorded music at around 28 gestational weeks. Infants as young as 24 gestational weeks have listened to music without ill effects, and may be considered candidates if medical status permits.
- Music duration should not exceed a total of 1½ hours per day made up of alternating segments of no longer than 30 minutes. Very young infants, or those displaying reduced oxygen saturation levels at music cessation, should receive shorter periods of stimulation (4-5 minutes) fading in and out, alternating with equal periods of silence. The nurse providing daily care for the infant should verify that he or she could benefit from sound stimulation before music is initiated. Many times the infant has endured medical procedures, is ill,

is demonstrating symptoms of over-stimulation, or is generally in need of the greatest amount of rest possible. The nurse is the best authority to decide if it is appropriate to play recordings or to determine if music should be terminated at any time.

Music for Neurologicål Development: Increasing Tolerance for Stimulation

For the premature infant, diverse stimuli are cumulative, easily becoming overwhelming and disrupting the neurological development that is maximized during homeostasis. The younger the infant's gestational age, the more easily he or she is overwhelmed. Stimulation must cease or be reduced for the infant to return to a relaxed state. Hyper-responsiveness is indicated by subtle disengagement cues such as hiccups, grimaces, clinched eyes, averted eyes, tongue protrusion, finger splay, or struggling, along with more potent disengagement cues such as crying, whining, fussing, making the cry face, spitting, vomiting, or hand-in-halt position. We theorized that music's ability to soothe infants would promote homeostasis even during increasing levels of stimulation. We wished to incorporate the therapeutic benefits of touch and massage that have been so effectively researched by Field (1987) to address the problem of an immature neurological system causing hypersensitivity to stimuli. Since faster habituation to changing stimuli without hyper-responsiveness leads to greater neurological maturation, our goal was to teach tolerance to accumulating stimuli.

We developed a procedure combining quiet humming, progressive stroking, and a method of accumulating multimodal stimulation developed by White-Traut and Tubeszewski (1986). In this procedure, one holds the infant without movement or stroking while humming a lullaby slowly, monotonously, and quietly for approximately 30 seconds. If the infant remains pacified, then slow, firm stroking begins. Tactile stimulation progresses in the same manner that the neurological system matures, i.e., cephalocaudally and proximodistally, from the head down and the center of the body outward. If at any point the infant gives a subtle disengagement cue, one discontinues auditory and touch stimulation for 15 seconds. A potent disengagement cue signals the caregiver to cease the procedure for the day. One cycle — the entire sequence from head to toe — takes approximately 15 minutes, and can be repeated if the infant remains in homeostasis. During the second repetition of the procedure, one adds rocking and infant-directed vocalizations. One measures infants' tolerance to stimulation by scoring the massage progress down the body. When the infant demonstrates tolerance for simultaneous music with massage, infant-directed vocalizations, and vestibular stimulation in the latter stages, the score increases.

We designed a study with 40 premature infants divided into experimental and no-contact control groups matched on the basis of gender, birth weight, gestational age at birth, and severity of medical complications (Standley, 1998). Participants also met the following criteria: corrected gestational age greater than 32 weeks at the time of the study; chronological age greater than 10 days; and weight greater than 1,700 grams. The experimental infants received stimulation 1 to 2 times per week from referral by the medical staff to discharge. Results showed that the music-based multimodal stimulation significantly decreased females' length of stay by an average of 11 days, and increased weight gain per day for both males and females. Both male and female infants' tolerance showed steady increases across the stimulation intervals, with females' tolerance increasing more rapidly than males'.

This procedure was established as an ongoing clinical program and proved to be highly effective. During our sessions in the NICU, we noted that some parents did not know how to interact with their premature infants, who were ready for stimulation in addition to kangaroo care. Medical staff sometimes criticized parents for overstimulating the infants. We designed a study to determine the effects of parents using the music and multimodal stimulation procedure on infants. (We found these parents more willing to hum to their children than the parents in the previously mentioned study were to sing lullabies.) In this

Music Therapists as Professionals in the Infant/Family Field

Musical activities can be utilized to promote a wide array of cognitive growth, social interaction, and motor coordination skills in early childhood, and have been a traditional component of curricula for infant stimulation and early childhood education (Davis, 2001). Many music professionals interact with young children, but music therapists specialize in the use of music to achieve specific objectives for special-needs children of all ages.

Music therapists complete a 4-year undergraduate degree rich in functional music knowledge, psychology, special education, anatomy, and physiology. The undergraduate degree requires 1200 hours of clinical internship. Completion of the degree qualifies an individual to take a national certification test resulting in the professional designation, MT-BC (Music Therapist, Board Certified). Music therapy is usually integrated in an interdisciplinary team-decision process. The team bases treatment on the diagnosis of a specific problem and an assessment of the problem's severity and complexity. The treatment plan matches research-based music therapy techniques to the clients' problems, personalities, and preferences, with systematic evaluation of results. Music therapists working in the NICU may complete specialized training specific to the needs of the premature infant.

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study, we divided 20 sets of parents and their premature infants referred by the medical staff for developmental stimulation into experimental and control groups, training experimental parents in the above procedure. We then observed parent-neonate interactions in both groups. Results showed that experimental parents spent significantly more time in the NICU; their infants exhibited fewer stress behaviors; and instances of parental overstimulation declined (Whipple, 2000). The experimental parents indicated that it was a relief to know a specific procedure that included information on how to be aware of the responses of their fragile children. They also felt that their interactions became more beneficial to their babies.

Music is a highly effective tool for teaching new behaviors to individuals of all ages.

Music for Behavioral Change

During consultations with the NICU nursing staff, we learned about the problem of "feeders and growers," those infants whose medical problems were basically solved but who remained hospitalized for failure to independently feed after an extended period of gavage feeding. We knew that all learning at the beginning of life is cause-and-effect learning, and that premature infants miss many opportunities to discover such relationships, as much of their care is scheduled around medical considerations, not infant signals of hunger, discomfort, or desire for nurturing. These infants' behaviors lack consequences. Studies have found music to be a highly effective tool for teaching new behaviors to individuals of all ages, from term infants to the elderly, for diverse needs within educational, home, and health settings (Standley, 2000a). We felt that music had the potential to provide learning opportunities for premature infants, specifically in the case of non-nutritive sucking.

The infant's sucking ability is critical for both neurological development and survival. Sucking is the first rhythmic behavior in which the infant engages, and research suggests that it contributes to neurological development by facilitating internally regulated rhythms — the first time EEG brain waves are detected often correlates with the initiation of fetal sucking. Non-nutritive sucking is a naturally occurring behavior of third trimester fetuses. Non-nutritive sucking also increases oxygen saturation. Unfortunately, medical and environmental constraints often inhibit the sucking responses of premature infants, and some must be taught this skill later.

We wanted to use music to reinforce non-nutritive sucking, and, in time, to connect the two. We developed a pacifier fitted with a transducer that detected changes in air pressure at the initiation of a suck and sent an electrical signal to a tape recorder (Standley, 2000b). A timer fixed a number of seconds of musical reinforcement for each suck, and re-set for each additional suck. We also controlled the sucking pressure necessary to activate the signal.

We designed a study to determine whether premature infants would increase non-nutritive sucking rates in response to musical reinforcement. Subjects were 12 premature infants born at an average gestational age of 29⅞ weeks. At the time of the study, their average adjusted gestational age was 35½ weeks. Each baby served as his or her own control in a 14-minute ABAB design: an initial baseline of 2 minutes, followed by 5 minutes of contingent music, a return to baseline for 2 minutes, and a return to the contingent music condition for 5 minutes. Results showed that the premature infants' sucking rates were 2.43 times greater during music than during silence. During their first learning opportunity with this pacifier, they learned to control the music duration within about 2½ minutes, meaning they sucked frequently enough to keep the music playing continuously, and more than doubled their sucking rates. Astonishingly, premature infants learned to manipulate this device as quickly as older, term infants had learned to manipulate a mercury switch on their foot to receive musical reinforcement (Standley & Madsen, 1990). We were astonished to find, again, that age did not correlate directly with infant learning rates.

We designed a second study to ascertain whether increased non-nutritive sucking rates affected feeding ability. At 34 weeks, premature infants are ready for nipple feeding. After the premature infant has been tube fed for an extended period, caregivers sometimes must teach infants to coordinate nutritive sucking with swallowing and breathing. Physical therapy can improve feeding attention, capability, and sucking response enough to allow infants to gain adequate daily nutrition by mouth, but also can be ineffective or time-consuming. Subjects in this study were 32 premature infants who were more than 36 weeks gestational age and who were referred for failure to independently feed. They were all participating in 2 nipple-feeding opportunities per day — one in the morning and one in the evening — and were divided into experimental and no-contact control groups. Babies in the experimental group received one musical 15-minute non-nutritive sucking opportunity using the previously described device approximately 1 hour prior to the evening's nipple-feeding. Data collected on the feeding rates in the morning versus those of the afternoon feeding showed that infants receiving music reinforcement for non-nutritive sucking significantly increased their nipple feeding rate in the afternoon, while the control babies' feeding rates were actually worse in the afternoon (Standley, 1999).

We were surprised to see such immediate gains. Premature infants used their increased non-nutritive sucking skills during feeding opportunities. We theorized that

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For professionals who are looking for challenge in leadership and policy development, you'll find links to both "Leaders for the 21st Century" and the "State Early Childhood Policy Leadership Forum," with information on applying for fellowships, current issues, and projects current fellows are pursuing. You'll also find resources you can use.

PARENT TIP OF THE WEEK

Parents and those who work with them can check in weekly for our ZERO TO THREE tip. Covering a variety of topics such as curiosity, grandparents, play, and more, tips can also be found in our Archives.

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during the non-nutritive sucking with music reinforcement learning opportunity, the infant produced sucking bursts followed by pauses to listen to the music, thus learning the requisite pacing necessary to accomplish feeding.

A Meta-Analysis of Music Research with Premature Infants

After 10 years of research on music and premature infants, we felt a need to assess and summarize the collective results. The meta-analysis revealed highly significant effects of almost a standard deviation due to music treatment with an overall effect size $d = .8268$, $p < .001$ (Standley, 2002). Results were homogeneous, indicating consistent benefit across all studies. That is, diverse applications of music provided significant, positive effects for premature infants across a variety of physiological and behavioral variables: observed behavior state, heart rate, respiration rate, oxygen saturation level, weight gain, days in hospital, feeding rate, and non-nutritive sucking rate. Some of these initial studies utilized small sample sizes; certainly further research with larger sample sizes in randomized, controlled trials is warranted. However, initial results suggest that music has great potential as a developmental aid when used correctly in the NICU environment.

Conclusions

Music therapy in the NICU improves the environment of premature infants while promoting specific, immediate neurological and developmental benefits. Music masks aversive ambient noise, stabilizes physiological well-being, pacifies in the presence of changing stimuli, and reinforces behavioral changes. It promotes these positive changes with no known detriments, a novel attribute in the problematic neonatal intensive-care environment. Research in this area is too new to determine other developmental consequences that may follow. However, results are conclusive enough to justify continued investigation and clinical applications of very early Early Intervention with music.

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LULLABIES AND PLAYSONGS:
Why We Sing to Children

LAUREL J. TRAINOR, PHD
Department of Psychology, McMaster University
Hamilton, Ontario
ljt@mcmaster.ca

PHOTO: NANCY GUADAGNO

Music-making is a wonderful but mysterious human activity. Every known society has had music. And every society appears to have special songs for infants and children. In this article, I examine the hypothesis that music originated as a form of emotional expression facilitating social interaction between parents and infants, and served an important evolutionary function in promoting babies' survival.

Human infants are helpless for a long period of time. They depend on their caregivers for survival. Perhaps early in the evolution of human beings, singing provided a means for parents to stay in contact with their infants, promoted social bonding between parents and infants, and helped parents regulate their infants' states. Definitive answers to evolutionary questions are hard to come by. However, if music evolved as a way to care for infants effectively, we would expect parents to communicate emotionally when they sing to their babies, and we would expect infants to respond. Recent research on these issues is presented herein.

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Why Mothers Sing to Infants

A number of researchers have noted that every known culture has songs for infants, and that singing to infants appears to be a normal part of everyday caretaking activities (Trehub & Trainor, 1998). A study in which mothers kept diaries of their singing activity throughout the day found that they sang not only while playing with their infants, but also during feeding, diaper-changing, bathing, and car travel

at a glance

- By helping parents stay in contact with, bond with, and regulate the emotions of their infants, music may have served an evolutionary purpose.
- Mothers sing two distinctive types of songs – lullabies and playsongs – to their infants.
- Babies prefer infant-directed songs, higher-pitched singing, and songs adults have rated as "loving."
- Music may help infants learn to regulate themselves.

(Trehub et al., 1997). Interestingly, this singing tends to be spontaneous; some mothers in the study were surprised to learn how much they were singing to their babies.

We don't know for sure why parents sing to infants, but the fact that they do across cultures suggests that it is important. Singing to babies may serve three main purposes (Trainor, 1996):

1. Mothers may sing to their babies to get their attention and focus it on what is important in the world — the mother's face, for example.
2. Babies' perception of patterns in music may promote their perception of speech, which also relies on segmenting ongoing, changing patterns of sound.
3. Adults may use music for emotional communication, social bonding, and regulation of infants' states: A crying baby often responds to rocking and singing.

What and How Mothers Sing to Infants

Every culture has special songs for infants. But what makes a song suitable for infants? Is it structure of the melody — i.e., something about the pitch and rhythm? Or is it the way it is sung — i.e., quickly or slowly, at a high or a low pitch, or in a gentle or animated tone of voice?

To investigate this question, we first collected recordings of lullabies from cultures around the world. Next, we matched each lullaby to a recorded song from the same culture that had been sung at the same tempo as the lullaby (Trehub, Unyk, & Trainor, 1993a, 1993). We then asked adults to listen to each pair of songs and tell us which one was the lullaby. Adult listeners identified the lullaby correctly about 6 times out of 10 (63%). However, when we played the melodies on a synthesizer to eliminate the lyrics and vocal qualities (timbre), adults were no longer able to identify the lullabies. This suggests that structural features (for example, pitch and rhythm) do not alone make a song suitable for infants. Rather, the singer makes it "infant-directed" by the way she sings it — by her performance.

To begin examining performance characteristics, we recorded each mother in our sample singing a song of her own choosing to her baby. Then each mother sang the same song without the baby present (Trehub, Unyk, & Trainor, 1993b). When the mothers were from a Western culture, adult listeners from the same culture could tell more than 90% of the time when the mother was singing to a baby and when she was not. Even when the mothers were Hindi-speaking and sang Hindi songs, Western adults could distinguish between the infant-directed and non-infant-directed versions over 70% of the time. It seems, then, that mothers perform in a distinctive way when their baby is the audience.

A number of researchers have noted that every known culture has songs for infants, and that singing to infants appears to be a normal part of everyday caretaking activities.

How can we describe mothers' "performances" for their babies? We have identified three characteristics of infant-directed singing:

1. **Songs sung to babies are sung at a higher pitch than non-infant-directed versions** (Trainor & Zacharias, 1998). Interestingly, across species, animals signal aggression by low-pitched loud sounds and friendliness by high-pitched sounds (Morton, 1977).
2. **Infant-directed singing is slower than non-infant-directed singing** (Trainor, Clark, Huntley, & Adams, 1997). This performance characteristic may be in part an unconscious adjustment to infants' slow speed of processing, but even adults find slower speech to be more benevolent than fast speech (Brown, Strong et al., 1973).
3. **The most salient feature of infant-directed singing is the loving tone of voice mothers use when they sing to their babies** (Trainor, 1996; Trainor et al., 1997; Trehub, Hill et al., 1998). The acoustic features of this emotional expressiveness are not easy to articulate. However, consistent with studies of vocal emotion in speech (Scherer, 1986), we found that versions of songs sung to babies were high in *jitter* (small variations in the pitch that sound like wavering of the voice); were high in pitch variation across each vowel; and contained less energy at the high-frequency end of the spectrum, giving them a less nasal quality (Trainor et al., 1997).

By these three characteristics, infant-directed singing appears to be particularly friendly, reassuring, and non-threatening.

Playing and Sleeping: Playsongs and Lullabies

We noticed that mothers sing in two distinct styles to their infants, which we called playsongs and lullabies. Lullabies are soothing, and appear to be designed to calm an infant, whereas playsongs are rousing, and appear to be designed to keep a baby alert and focused on interesting things in the environment. Do mothers change the style of their singing in order to achieve different caretaking goals associated with emotion and state regulation?

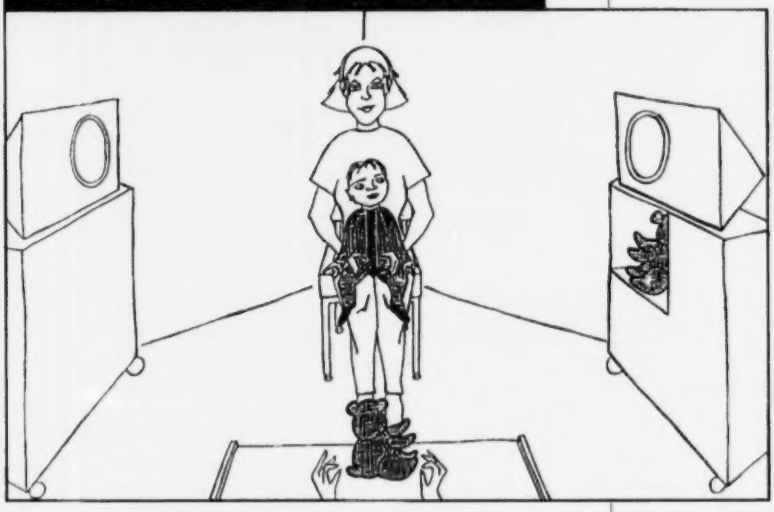
We first asked whether adult listeners could distinguish between lullabies and playsongs on the basis of performance characteristics (Rock, Trainor, & Addison, 1999). We asked half of the study mothers to choose a lullaby and sing it to their baby. When they had finished, we asked them to sing the same song, but now as a playsong. We then asked the remaining mothers to sing a playsong first, and then to sing that song as a lullaby. The lullaby and playsong versions of the songs were completely

different. Not surprisingly, adult listeners could correctly identify which recordings were intended to be lullabies and which were intended to be playsongs 100% of the time. This finding tells us that — at least from the point of view of adult listeners — it is how the mother sings a song to her baby that makes it either a lullaby or a playsong.

Adults describe playsongs as more "smiling in tone," "brilliant," "clipped," and "rhythmic" than lullabies, and lullabies as more "airy" and "soothing" than playsongs (Rock et al., 1999). Acoustic analyses show that mothers raise their pitch more and show more pitch-wavering in playsongs than in lullabies, and sing more slowly in lullabies than in playsongs (Trainor et al., 1997). We can conclude then, based on adults' judgments and on acoustic analyses, that playsongs and lullabies convey different emotional messages, suggesting that mothers sing to their babies the way they do in order to communicate with them emotionally.

But what about the babies? Do they respond to the emotional quality of infant-directed singing?

FIGURE 1. MEASURING PREFERENCE



Infants as Aficionados

In order to test infants' preferences for one song over another, we used a looking-time measure (see Figure 1). In this procedure, the baby sits on his or her parent's lap facing an experimenter. Both the experimenter and the parent listen to music over headphones so they cannot hear what the baby is hearing. When the experimenter presses a button, a light flashes on one side of the infant, revealing a toy. When the infant looks at the light, the experimenter presses a second button, causing the light to stay on and song A to play from the loudspeaker on that side. When the infant looks away from the illuminated toy, the light and song go off. The same process is repeated on the other side of the infant with song B. Songs A and B alternate, with the infant controlling the amount of time he or she listens to each song. As long as the infant looks, the song continues to play. When the infant looks away, the song stops. By comparing the amount of time infants choose to listen to song A versus song B, we can tell which they prefer.

We wondered whether babies would prefer to listen to an infant-directed version of a song rather than a non-infant-directed version sung by the same mother. Across a number of songs, infants looked significantly longer in order to hear the infant-directed versions (Trainor, 1996). This tells us that the way mothers sing to them does indeed matter to babies. Mothers change the way they perform a song when they are singing to their babies, and babies appreciate the results of their mothers' efforts.

Next we asked whether infants respond to features of the singing that convey emotion. Adult listeners had told us how "loving" they considered each recorded infant-directed song to be. We found a significant correlation between each song's adult "love rating" and the length of time babies chose to listen to a song. The more loving the singer's tone of voice, the longer infants chose to listen to her song.

Finally, we asked whether infants would prefer higher-pitched singing (Trainor & Heinmiller, 1998). We recorded adults singing simple songs of their own choosing in their most comfortable pitch ranges. We then recorded them singing the same song a little higher and a little lower. When infants were given a choice, they chose to listen longer to the higher-pitched versions.

What about the differing emotional messages mothers send to babies through their distinct styles of performing lullabies and playsongs? Do infants pick up on this information? To address this question, we took our recordings of mothers singing songs of their choosing in lullaby and playsong versions, them videotaped infants as they listened to these recordings (Rock et al., 1999). When adults watched the tapes — without sound — they could tell from babies' reactions when they were listening to lullabies and when they were listening to playsongs. Listening to lullabies, the infants tended to look down at their hands. Listening to playsongs, infants tended to focus their attention outward, looking around the room; adults said the babies looked as if they expected something interesting to happen. (It is important to note that for the purposes of our study, we alternated lullabies and playsongs every 30 seconds regardless of the state of the infant. Outside the laboratory, where mothers tune their production of lullabies and playsongs to their infants' needs as they perceive them, the different effects of lullabies and playsongs are probably even more dramatic.) We can conclude from these studies that mothers not only produce emotional singing for

babies, but that babies respond to the messages their mothers send them through song.

In our current research (Schmidt, Trainor, & Santesso, in press) we are recording electroencephalograms (EEGs) of 3-month-old and 12-month-old infants as they listen to orchestral recordings that adults have described as "happy," "sad," and "fearful." We are finding that music that has a rousing effect upon most 3-month-olds has a calming effect on most 12-month-olds. This difference likely reflects increased self-regulation in 12-month-olds compared to 3-month-olds — i.e., the 12-month-olds have more control over how much attention they pay to the music and how much they let it affect them. In practical terms, this tells us that one cannot necessarily predict how an infant, or a group of infants, will respond to recorded music, even music designed for children — especially across different ages. Sensitive "live" singers adjust their performances to fit the needs and reactions of their infant audiences. They sing lullabies to calm an upset infant and playsongs to captivate an alert baby, constantly adjusting volume and pitch to get the optimal response from the child, whatever the age or temperament.

Conclusions and New Directions

Human music-making remains wonderful, but becomes less mysterious, when we systematically investigate the role of music and emotion in the early development of children and in the history of our human species. Our experimental research has helped us understand how mothers produce emotional singing that is exquisitely tuned to the needs of their babies, and how infants respond to this singing, forming closer bonds to their mothers, on whom they depend for survival. Along with other behaviors such as touching and rocking, singing helps caregivers co-regulate infants' states, and likely contributes to infants' increasing ability to regulate their own states.

We are continuing to learn about the similarities between infant-directed speech and infant-directed singing. A decade ago, Fernald (1992) described the basic differences between infant-directed and adult-directed speech. More recently, we have documented that infant-directed speech, like infant-directed singing, is highly emotional, with speakers using different pitch contours and rhythmic patterns to convey different emotions (Trainor, Austin, & Desjardins, 2000). Infant-directed speech is, in fact, more like music than is adult-directed speech. Infant-directed speech contains a great deal of repetition, large pitch contours, and more obvious rhythmic patterning. Infant-directed singing, on the other hand, is more like speech than is adult music. It generally has a restricted pitch range and long pauses between phrases; adults singing to babies are more conversational and spontaneous than they are when they sing in other contexts.

Perhaps music and speech have a common developmental origin. As we explore this possibility, we will build on what we have learned about lullabies and playsongs, mothers as spontaneous performers, and babies as extraordinarily responsive audiences. By investigating how parents use infant-directed song and speech to promote bonding, social interaction, and emotional communication with their infants, we hope to understand more about how babies — and all humans — survive and flourish.

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PHOTO: FAITH BOWLUS

MUSIC IN THE TIME OF TODDLERS

DANETTE LITTLETON, PHD

The following essay is about one child and her life with music from the age of 18 to 36 months. During this time, I had the once-in-a-lifetime opportunity to play with my granddaughter every day. This account focuses on her play with music and includes representative examples of dancing, singing, and pretending. These episodes took place at her home, where the musical resources consisted of recordings for children, children's television (*Teletubbies*, *Mr. Rogers*, and *Sesame Street*), musical toys, instruments, and, of course, her parents' musical interests. Our involvement was voluntary — not imposed — and spontaneous — not planned. Playing alone, she created songs and chants while drawing and playing with dolls, blocks, and other toys.

As I discuss this child's emerging musical skills, understanding, and sensitivity, I show how play contributes to children's early acquisition of music and their musical development. I refer to the work of others who have influenced my thinking about music during the toddler years. Finally, I propose a new perspective on the importance of emergent musicality in infancy and early childhood.

Music in the Life a Toddler

Gabriela's mother loves music. When Gabriela was an infant, she sang to and danced with her baby daughter. At bath time, she sang lyrics from popular children's songs: "Splish, splash, I was takin' a bath…" "Rubber Ducky, you're the one…" and "The eensy weensy spider climbed up the water spout…." On dry land, they played with musical toys and instruments and listened indoors and out, especially for the chirping of crickets and birds. They danced to Argentine tangos and the music of the Andrews Sisters and played dancing games, shouting, "Round, and a-round, and a-round, and stop!" Gabriela especially liked what they called the "Stop-and-Go Dance," including her version, "Stop-and-Go-and-Fall-Down Dance." Often, they sang while they danced and played child-size tambourines, drums, and maracas.

By 18 months, Gabriela's dance styles were varied and vigorous. In addition to performing spontaneous solos, she loved being picked up, twirled around, and skipped and swayed with to music. What she called a "Carry-Me Dance" was enjoyed by both parent and child. Any song might prompt a "Carry-Me Dance," particularly if it called for energetic, spirited movement:

> Mommy and Nana take turns carrying and dancing Gabriela around the living room, down the hall to the kitchen, and back again to the music of *The King and I* (CD soundtrack with Yul Brynner and Deborah Kerr). Gabriela says "Again!" each time "Shall We Dance?" finishes. We notice she follows the orchestral response to Yul Brynner's "Shall…we…dance?" with her own "Boom-boom, boom!" There are no lyrics, just 3 beats, an instrumental answer to the lyric's question. She laughs. "Again!" It seems she hears a musical joke that gets funnier each time. We play it again. Now, it's musical peek-a-boo: she listens, waits, and responds exactly

at a glance

- There is little research on children's musical play: Music researchers do not study play and play researchers do not study music.
- Musical play leads to complex mimicry, make-believe, and word play.
- In groups, very young children may create full-scale musical dramas, complete with impromptu songs, dances, and instrumental improvisation.

on time with each "boom-boom, boom." We laugh with her as she discovers new places in the orchestral interludes between verses, the orchestra picking up the singer's melody and rhythm. We follow rather than lead to avoid pre-empting her and spoiling the game. As she sings each repetition, we exclaim, "There it is again!"

I bought Gabriela a videotape of the 1951 movie just so that she could fully experience "Shall We Dance?" She was amazed as we watched Kerr and Brenner's memorable execution of Jerome Robbins' choreography. Given the complexity of this stylized polka, I wondered which, if any, dance steps Gabriela would notice. "Again!" I rewound and fast-forwarded the videotape, as she directed, to exactly where the dance began. She immersed herself in the music and moving images until she knew how the dancers moved, what they sang, and the dialogue they spoke. That first time, when we reached the end, she said, "Stop, it's scary." She had found the orchestra's abrupt harmonic transition signaling

Music-Making in the First Year

MONTH 1 Loves the human voice, especially one that is soft, high-pitched, and melodic. Prefers rhythmic rocking, swaying, and bouncing while being held close to the heartbeat.

MONTH 2 Vocalizes musically with coos, cries, gurgles, and growls. Loves your vocal responses and reciprocal expressions.

MONTH 3 Enjoys sounds and movement of rattles and other gentle sound-makers. Begins to look and grasp. Attends to the sound of your voice and explores the sound of her voice.

MONTH 4 Wiggles, kicks, and stretches. More alert to sounds, voices, and rhythmic music. Baby's vocalizations increase in variety, tonal range, and dramatic effect.

MONTH 5 Explores things by looking, touching, holding, moving, and tasting. Loves interactive play with music; communicates with vocal sounds, movement, gestures, and facial expressions. May match pitch when sung to or when listening to music from tapes, CDs, or TV.

MONTH 6 Opera singer. Baby uses a wide repertoire of expressive cries, squeals, giggles, and coos to communicate feelings and encourage a desired response. Body movement and facial expressions correspond to baby's vocalizations.

MONTH 7 Recognizes familiar voices and responds to the sound of his own name. Begins to imitate speech sounds and vocalizes extended phrases. Singing repertoire expands. Loves fingers and toes and everything that moves. Responds to rhythmic sounds and movement.

MONTH 8 Loves to babble. Baby listens to you talk to her with greater concentration. Loves picture books and words that rhyme. Plays musical games of "my turn" and "your turn" and "peek-a-boo." Moves body rhythmically and vigorously.

MONTH 9 Percussion player. Baby loves to make things make sounds. Bangs objects together, drops things, and listens. Vocal sounds and song repertoire expands. Enjoys imitating any new sound — clicking, smacking, coughing, and laughing. Babbles long "sentences" and sings with greater variation in pitch, timbre, and "language." Swings, sways, bobbles, and bounces to music he hears or makes himself.

MONTH 10 Baby's need to express feelings results in vocal and body movement with clear displays of delight, disappointment, angst, and displeasure. Responds to music more expressively. Shows greater interest and competence in imitating sounds of speech and song and responding to rhythmic movement and dance.

MONTH 11 Baby's recognition and repertoire of names of familiar objects expands. Physical capabilities expand to allow more mobility and opportunities for creative exploration: opening and shutting; emptying and filling; stacking and knocking down; and throwing, crashing, and banging. Toy instruments are greatly prized as objects of exploration because they "talk back." Appropriate children's CDs, videotapes, DVDs, and television programs entertain and promote musical awareness, especially if a loved one initiates musical interactions. Books that rhyme and emphasize sounds encourage concentration and interaction with music's elements.

MONTH 12 Songs; vocal and environmental sounds; rhythmic speech and body movement; and musical play with toys and instruments form foundation of baby's musical development. By 12 months of age, baby's musical interests, preferences, and abilities are distinctly her own.

that the dance was over "scary," a toddler's way of saying that the musical mood had suddenly turned dark.

Gabriela's father made looped tape of "Shall We Dance?" so it could be played without Gabriela having to ask someone to re-cue the recording. "Again!" she told the tape player. In later play episodes, she found new dance partners in a large, soft toy dog and a birthday balloon. Gabriela asked for a "hair thing and big dress" to enhance her role as "Mrs. Anna," insisting that either her mother or I play "The King." We sang and danced our respective parts, hewing as closely to the original as we could. That a toddler's interest in this song could endure so long was — in the words of the King of Siam — "a puzzlement!"

The next music and dance episodes that captivated Gabriela were the "Spinach Dancer" and other soloists from *Riverdance*. Just as she had captured the personality of Mrs. Anna, Gabriela *turned into* the Spanish dancer, gesturing, posing, and moving expertly along to the flamenco guitar, then transformed into Jean, the Irish dancer with arms locked at her sides and feet flying. Soon, she adopted two ballet roles: *The Nutcracker*'s Clara and *Sleeping Beauty*'s Aurora.

Throughout her second year, an ever-widening range of expressive movement reflected Gabriela's growing musical awareness, just as her growing musical awareness reflected her new range of expressive movement. For this toddler, music and movement were inseparable. She danced along to vocal or instrumental recordings, interacted with singers and dancers on videotape, and created songs and dances alone. Her gestures, movements, melodies, and interjections were a kind of aesthetic vocabulary she could organize, structure, and play with at her leisure.

Additionally, I observed that music's rhythm and rhyme were forming a vital part of Gabriela's spontaneous language-play. The following are examples:

1. Repeated briskly in 4/4 time:
Pretty little MER-maid, splashing in the WA-ter!

Smithsonian Folkways Children's Music Collection. **Various artists.**
SF, CD #45043 (1998).
Selected from over 200 recordings for children from the Smithsonian, this disk contains 26 child-friendly, authentic children's folk songs, play-party games, and poems that span different eras and cultures in the USA. When Gabriela was 15 months old, her favorite was Woody Guthrie's "Car Song." (She sang the "brrr" part.) Ask for a complete catalog from the Smithsonian, which carries jazz, blues, and world music as well as music for children.

Old English Nursery Rhymes. **Various artists.**
Saydisc Records, CD #SDL 419 (1996).
Such good quality is rare. Fifty-two authentic songs and rhymes performed in a traditional and delightful manner by good vocalists and instrumentalists. *Children's Singing Games of England, Wales, Southern Ireland, and Scotland* is the must-have companion CD.

Lullaby: A Collection. **Various Artists.**
Songs for Little People, CD #9362-42565-2 (1994).
The artists on this collection — among them Tish Hinojosa, Judy Collins, Ladysmith Black Mambazo, Bobby McFerrin, Take 6, and Sweet Honey in the Rock — offer comfort for weary parents and their children. Sleep tight.

Return to Pooh Corner. **Kenny Loggins.**
Sony, CD #7464-57674-2 (1994).
Kenny Loggins presents favorite songs for or about children — including the favorite, "Back to Pooh Corner" — lushly orchestrated.

Smilin' Island of Song. **Cedella Marley Booker.**
Music for Little People, CD #9-42521-2 (1992).
Yes, that's Bob's Mama. This will make you dance and wiggle. If you have a drum, play it; if you have rattle, rattle it. You'll know some of the songs. Sing!

A Child's Celebration of Song, Vols. I & II. **Various artists.**
Music for Little People, CDs #9362-42519-2 (1992), #R2 7257-4 (1996).
If you like one of these CDs, you'll have to have the other one. A range of artists and musical styles — popular songs; folk songs; songs you forgot you once knew and loved — are available on these 2 song collections, which include Tom Paxton's "The Marvelous Toy," Judy Garland's original "Over the Rainbow," "This Old Man," and more.

All Aboard! **John Denver.**
Sony, CD #7464-63412-2 (1997).
Did you know that this children's album was Denver's last recording? Denver's simple, powerful musical style makes these traditional railroad songs a delight for you and your little one. "Jenny Dreamed of Trains," "Freight Train/Choo-Choo Boogie," "I've Been Working on the Railroad," "Daddy, What's a Train?" and "The Little Engine That Could" will take you on a musical journey that is funny, happy, and only a little sad.

Holiday Tradition. **Itzhak Perlman with the Israel Philharmonic.**
EMI Digital, CD #C-7-47904-2 (1987).
This is a stunning collection of Jewish melodies that go from Perlman's heart to yours. Favorites include "By the Wayside Stands A Tree" and "Where Shall I Go?"

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2. With a lilt, in 6/8 time:
My HANDS are all GOO-ey —
My HANDS are gooey for YOU!

3. A knock-knock joke:
Knock, KNOCK!
Who's THERE?
Gab-ri-EL-a-Cin-der-EL-la…

Other examples of language-play included a new twist on her mother's name — "You are scarin' me to Beth!" — and invented words and definitions. "What's a 'dis-ta-pad?'" "Something that sticks his feet out of bed." Play names for dolls included Anna-fie, Obrazella, and Po-non-ah-pay, a boy-doll's name. When we first visited the library together, she explained how I should behave. "Tee-sey, tee-sey, Nana," she whispered. "Be very ten-si-ly." "Oh, yes," I replied. "I'm always ten-si-ly at the library."

Around 2½, she immersed herself in the recordings and videotapes of *Mary Poppins* and *The Sound of Music*. She delighted in the rhyme and rhythm of "Supercalifragilistic-expialidocious" and the hilarity of tea parties on the ceiling and "A Spoonful of Sugar." The children's songs from *The Sound of Music*, such as "The Lonely Goatherd," with its puppet show, and "Do-Re-Mi," gave her new musical playmates. However, it was Maria's "I Have Confidence" that Gabriela took as her theme song. She memorized it in its entirety, devised a costume and props, and performed it almost as many times as Julie Andrews. Before one performance, Gabriela, in a Maria-esque hat and jacket, turned to me and asked, "Where's my confidence?" We looked around the playroom until she "found" it in her toy box in the form of a plastic carrying case. "It's my confidence!" "You must carry your confidence!" I replied. With attention to appearance and gesture, Gabriela climbed halfway up the stairs, sat down, peeked through the railings, and began, "A captain with seven children…" Descending the stairs, she continued, "I have confidence in confidence a-lone" while she flung her plastic case and guitar around herself, skipped, ran, and arrived, breathless, at the pretend front door. She rang the bell. "I'm the new governess!" "And I'm the old butler, Fraulein," I replied. We played Maria and the butler throughout the house and around the yard, with Gabriela musically proclaiming her "confidence."

By the time she was 3, Gabriela's vocal repertoire included children's folk songs from the *Smithsonian Folkways Children's Music Collection*, all of John Langstaff's *Songs for Singing Children, Old English Nursery Rhymes*, and selections by Ella Jenkins, Woody Guthrie, and Sweet Honey in the Rock. Her favorites were the songs of Disney's princesses (all of them); *Pure Imagination*, by Michael Feinstein; *The House at Pooh Corner*, by Kenny Loggins; *Hush*, by Bobby McFerrin and Yo-Yo Ma; *Music for Little People*; and various world music artists, especially Miriam Makeba's recording of *The Click Song*.

Putamayo's *World Playground* CD propelled Gabriela into numerous singing, dancing, and tambourine-playing sessions. She was attracted to two songs in particular and played them over and over as she explored colorful new movements. Her solo improvisations evolved into well-choreographed dances, each expressing the musical structure and rhythmic and stylistic features of the song. She listened intently to the lyrics as she danced and soon caught the language well enough to convincingly sing *Fatou yo* in Mandingo and *Tik Tik Tak* in Greek.

Gabriela also delighted in opera, particularly Cecilia Bartoli's recording of Rossini's arias: with each of the singer's string-of-pearls, chromatic runs, Gabriela squealed with delight. As we danced to Bartoli and Rossini, I though, "It is as though this sounds to her like glitter *looks*, sparkly and irresistible!" Even the unaccompanied recitatives held her attention. Gabriela's favorites were "Riedi al soglio" and "Ah, non potrian resistere." What was it about opera that Gabriela found pleasing? Certainly not the Italian texts: "Riedi al soglio" (I feel perfect happiness) and "Ah, non potrian resistere" (Cupid will rekindle the spark of people's happiness). I theorized it was that she understood what the music said to her about being happy. Even without a storyline, characters like Maria, and pictures and video images, the musical information — crisp rhythms, quick tempo, bright tone, acrobatic melodies, and pleasingly predictable cadences — communicated pure, unrestrained joy.

Vivaldi, Handel, and Mozart were the "soundtracks" for our dramas about evil queens and good queens, and savvy princesses.

When Gabriela listened to orchestral music, she was unaware of any of the pieces' histories and context. Nevertheless, Vivaldi's *Four Seasons*, Saint-Saens' *Carnival of the Animals*, Handel's *Water Music* and Mozart's *Eine Kleine Nachtmusik* often prompted a favorite pretend game: "Can we make a castle?" Indeed, we built castles with red cardboard bricks, tables, and chairs, and placed dolls and stuffed animals in the "kingdom" dressed in colored scarves and tiaras. Vivaldi, Handel, and Mozart were the "soundtracks" for our dramas about evil queens and good queens, and savvy princesses who bravely escaped big trouble.

More musical play episodes and events of note involved reading storybooks and verse with irresistible rhymes and rhythmic patterns together, including *Mad About Madeline: The Complete Tales* by Ludwig Bemelmans; *When We Were Very Young* by A. A. Milne; *Chicka Chicka Boom Boom* by Bill Martin, Jr. and John Archambault; and books by Dr. Seuss.

Other picture books were used as musical "scores" for singing familiar songs such as "Miss Mary Mack," "Mockingbird," and "Over in the Meadow." Sometimes, Gabriela and I made up our own tunes for stories like *Sing, Sophie!* The book begins: "This the story of Little Sophie Adams, who had a voice so big folks claimed they could hear her from Corn County to the Oklahoma border." Here are three of Sophie's verses:

My dog ran off, my cat has fleas,
My fish won't swim, and I hate peas.
But I'm a cowgirl through and through.
Yipee-ky-yee! Yipee-ky-yuu!

I hate spinach! I hate liver!
Last week I fell into the river.
I bumped my knee, I scratched my nose,
I lost my shoe, I tore my clothes.

Whenever trouble passes by,
I don't worry. I don't cry.
'Cause I'm a cowgirl, don't you see?
Yippee-ky-yuu! Yippee-ky-yee!

Young Children and Musical Play: It's All Jazz

1. Show your enjoyment of music. Have fun when you sing, dance, and play.
2. Follow the child's musical lead. Imitate her vocal sounds, dance movements, and play with sound-making objects and toy instruments. When it's your turn, let go and let loose!
3. Explore musical ideas like a jazz musician: make up vocal sounds, musical conversations, and songs with abandon. Add some scat or doo-wop.
4. Play the drums and shake the shakers. Improvise rhythmic patterns with toy instruments and sound-making objects. Think of a word or phrase or a child's name to use as a rhythm, then make the instrument "say" it.
5. Use good judgment when selecting appropriate musical toys for young children. Choose instruments designed especially for young children that are safe, durable, and have good sound quality. Select instruments with contrasting sounds — clacks, rings, rattles, and booms — such as shakers, drums, woodblocks, triangles, cymbals, and bells. Consider a percussion instrument that can also play a melody, such as tone bells, a xylophone, or a keyboard.
6. "Sing" the text of picture books instead of simply reading. Vocalize the words. Chant or sing about the pictures. Make up different voices and sound effects for characters and events. Improvise.

The Musical Culture of Toddlerhood

While the experiences with music I have described belong to just one child, I believe they provide more general insights into very young children's musical dispositions, capacities, and potential. Young children, especially toddlers, prefer playing *with* music instead of playing *the* music (as in, the right notes). As with crayons and sidewalk chalk, very little children — and some adults I know — delight in doodling with sounds. Given young children's predispositions and preferences for spontaneity and "do-it-myself" discoveries, making music to them means "making it up myself."

Why, then, do adults regard children's play with music less seriously than they regard other forms of play? For example, those who admire and display children's spontaneous works of visual art do not easily tolerate child-made music. There are three familiar arguments against allowing children free play with music. They will a) make too much noise, b) destroy the instruments, and c) not learn anything. But children are always learning. What interested me was what they learned as they played freely with music.

During the past 50 years, few researchers have showed interest in developmental aspects of young children's music and play: play researchers did not study music and music researchers did not study play. A remarkable exception is found in the philosophy and practices of the long-forgotten Pillsbury Foundation School[1]. Throughout the school's 11-year history, Gladys Moorhead and Donald Pond in their roles of directors, facilitators, and researchers kept detailed written records, including case studies, and collected data on audiotape recordings concerning children's musical and social behaviors. In their first report (1941), Moorhead and Pond described the musical environment:

> The musical materials were available exactly as were any other materials, such as blocks, paints, playhouse, and climbing equipment. They were constantly present, were used informally at any time, and most of them could be taken to any spot in the building, porches, or yard where they were wanted. There was no restriction to the production of sound except where instruments were misused or during lunch and rest period. There was no attempt to limit vocal production.

[1] California attorney Evan S. Pillsbury's bequest established a foundation for the advancement of music education. Upon consultation, Leopold Stowkowski advised that the funds be used to conduct an in-depth study of young children's musicality and spontaneous music-making. The Pillsbury Foundation School, Santa Barbara, CA (1937-1948) enrolled children from 1½ to 8½ years of age. Gladys Moorhead and Donald Pond published four separate reports (*Music of Young Children*, 1941, 1942, 1951, 1978) describing children's free vocal music-making, use of musical instruments, and dance.

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> Emphasis was placed upon freedom for the children and upon development of social understanding and responsibility, which would give them power to maintain their own activities and organizations with the minimum of adult intervention. This was considered essential, as it was obvious that music as an individual and social activity could reach its natural forms only if the individuals and social groups within the school were free to evolve their own forms. (Moorhead and Pond, 1941, p. 8)

Giving children freedom to explore music — either alone or with peers — with a minimum of adult intervention seemed a reasonable thing for early childhood teachers to do and for researchers to study. Informed by the findings of the Pillsbury Studies and several years of teaching, I designed and conducted a series of observational studies on infant, toddler, and preschool children's play with music (Littleton, 1991, 1992, 1994, 1997, 1998). When I began, I believed that young children's play with music promised insights into their early social, cognitive, and musical development. I found that when playing freely in a music-rich setting, 3-, 4-, and 5-year-old children incorporated music into their dramatic episodes about family, familiar occasions and events, and storybook and television characters. Children in small, same-age, mixed gender groups created musical dramas based on an agreed-upon story line in which music was central to the storytelling. They negotiated events and roles through impromptu songs and dialogue, improvisations with musical instruments, and spontaneous dances and gestures. These young children manipulated musical elements (rhythm, tempo, dynamics, melodic content, and structure) and used conventional techniques to create music, form musical ensembles, and perform. In addition, I discovered that when young children created music individually, with partners, or in small groups, they engaged in lengthy periods of concentration and expressed a wide range of emotions with purposeful intent.

Do children have a musical culture of their own within the broader context of their musical and cultural heritage? Children's participation in the musical culture of the society and families that support them does not preclude the supposition that children have one all their own. In his comprehensive and meticulous study of the Venda people of Northern Transvaal, South Africa, anthropologist John Blacking found a children's musical culture distinct from that of the adults' (Blacking, 1995). Moorhead and Pond had concluded earlier that young children's music in the 20th century was "as different from [that of their] adult contemporaries as [the adults'] is from [the music] of the 11th-century Norman or today's Balinese" (Moorhead and Pond, 1941, p. 2).

We need to know more about children as music makers. To understand children's musical culture, we must consider the social and biological factors that influence where and how music comes to young children. Recent scholarship suggests that musicality is inherent — a uniquely human quality, a birthright passed down through generations of the human family. Music takes on meaning in the intimate, emotive interactions between mother and infant, believed to be the earliest form of musical expressiveness and human communication.

When it comes to experiencing music as a source of enjoyment and appreciation, young children have the intuitive edge. Like other musical cultures, children's music exists in a temporary world made up of musical players and co-players and events and happenings for an audience of oneself or many. The play of children involves fantasies not meant to replicate the real world. Rather, they are meant to fabricate an imaginary world that exists alongside the first one, a life more emotionally vivid than day-to-day reality. John Dewey said that the true work of art is not the object that sits in a museum or the performance captured on recording or film. It is the *experience* of the object and performance that proves to be the source of enjoyment or appreciation (Jackson, 1998, p. 5). Musical interactions — which help very young children discover how to play, how to learn, how to create, and how to share music — nurture emotional attunement and sensitivity, strengthen bonds of affection and attachment, and support lasting relationships if we stay in tune and in time with toddlers.

"Shall we dance?"

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From Mozart to Motown, Lullabies to Love Songs:

A Preliminary Report on the Parents' Use of Music With Infants Survey (PUMIS)

Lori Almeida Custodero
Pia Rebello Britto
Tao Xin
Teachers College, Columbia University, New York
lac66@columbia.edu

Photo: David Kreider

Music has been an integral part of adult-child interaction throughout history and across cultures (Trehub & Schellenberg, 1995). In the U.S. today, recordings of lullabies and classical music fill the shelves of music stores and "Mommy & Me" music classes abound in most urban and suburban settings, yet little is known about what parents are doing musically with their infants, and why. Do parents play music for their babies that they themselves enjoy listening to, or do they choose music specifically for babies? If parents choose to sing or play music specifically for babies, what influences their choices?

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at a glance

- A survey developed to study parents' musical practices and beliefs found that two-thirds of parents of 4- to 6-month-olds reported playing music every day, and were aware of the infant's active response.
- Parents were unsure of the validity of media claims that classical music made babies smarter, and reported using music to dance, play with, or calm infants.
- Eighty-six percent of parents disagreed with the statement: "Only those with beautiful voices should sing to their children."

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In recent years, commercial recording companies, foundations, and even state governments have invested substantial resources to encourage parents and caregivers to play recorded classical music to babies, based on the theory that such music can alter babies' brains and make them more intelligent. Are these campaigns affecting parents' use and choices of music with their babies? Systematic research is needed to answer these questions.

The Smart Symphonies™ project provided a way for an interdisciplinary research team at Teachers College, Columbia University, to gather data about parents' musical practices and beliefs. In 1999, The Grammy Foundation, a branch of The National Academy of Recording Arts and Sciences (NARAS), joined with Mead Johnson Nutritionals to produce and distribute Smart Symphonies™ classical music CDs to new mothers in hospitals and physicians' offices nationwide. This partnership evolved to include funding for our proposed large-scale research effort on the role of music in the lives of families with young children. The initial phase of the PUMIS project involved 20-minute telephone interviews with 2,250 English-speaking parents in the United States whose babies were 4 to 6 months old. The survey was conducted during October and November of 2000. (See sidebar, p. 43 for a description of survey instrumentation.)

This article is a preliminary report of our findings concerning the following: 1) Parents' singing and playing of recorded music; 2) specific use of the first Smart Symphonies™ CD; and 3) parents' general attitudes about music and babies. We close with a review of salient messages that have emerged from these data and a discussion of our research agenda.

Lullabies and Lovesongs

Approximately two-thirds of the 2,250 parents we interviewed stated that they sing and play music for their babies every day (69% reported singing daily); 64.5% reported playing music daily. An additional 19% of parents surveyed reported singing to their babies 1 to 3 times per week, and an additional 37% of parents reported playing music at least 1 to 3 times per week.

We asked parents whether they sang lullabies or children's songs, popular songs, or made-up songs to their babies. Most parents (66%) reported singing lullabies, although this result may have been influenced by biases inherent in the self-reporting methodology. Direct observation of parent-child interactions might reveal more spontaneous singing, including made-up songs, since parents may not consciously remember and report this type of improvisatory experience as readily as they report singing conventional lullabies to their babies. In a small diary study of 60 families, Trehub and colleagues (1997) found that all participants sang every day and that many of them expressed surprise, as they reviewed their diaries, at the amount of singing they did with their infants. We are planning to add a diary component to subsequent investigations with a group of families from the original study in order to supplement our more reflective responses from parents.

Parents are aware of their infants' responses to their singing. Inquiring separately about singing and playing music, we asked parents the following:

On a scale from 1 to 5, where "5" means "always happens" and "1" means "never happens," how often does your baby [do the following] when you sing to/play music for him/her?

Move arms and legs?
Make baby sounds?
Become calm and/or quiet?
Cry?
Become attentive?
Smile?
Go to sleep?

Smiling in response to music was the behavior parents reported seeing most frequently in their babies. They also observed their babies becoming attentive and moving their arms and legs. Even though singing is traditionally considered a way to help babies fall asleep, parents reported observing this phenomenon rather infrequently. We suspect that with 4- to 6-month-old babies, parents are looking for signs of overt communication. This interpretation of our findings is supported in the literature on the reciprocal nature of early musical interactions (e.g., Trevarthen, 1999/2000).

The parents in our survey tended to have had experiences with singing in both formal and informal contexts. Survey parents remembered their parents singing to them: just under 60% said their mothers had sung to them; 30% reported that their fathers had sung to them. Over half of the parents we surveyed (54%) had sung in a choir or other musical group. Singing was also related to their use of recorded music. We asked them the following questions:

On a scale of 1 to 5, with "5" meaning "always happens" and "1" meaning "never happens," when you listen to your favorite music, do you experience

an urge to hum or sing along?
relaxation?
an urge to move, like tapping to the beat or dancing?

Parents chose the "hum or sing along" response most frequently. Future analyses will investigate possible relationships between parents' musical experiences and attitudes and their musical practices with their infants. Studies in other domains, such as toddlers' pretend play (Haight, Parke, & Black, 1997), have shown that parents' experiences and beliefs about themselves are related to their beliefs concerning analogous parenting practices.

Mozart or Motown?

The music that parents sing or play when their babies are present is often not the same music they choose for their own enjoyment. When we asked parents what kinds of music they enjoyed listening to, two-thirds gave an answer that we categorized as "rock"(this included rhythm and blues, light rock, alternative, pop, and easy listening). One-

third said they enjoyed classical music. A total of just under 30% said they enjoyed the merged categories of country & western/folk music or world music/jazz. Interestingly, parents reported a rather narrow range of musical preferences. Only 55% named at least two types of music they enjoyed; 24% named three types; and 14% named more than three types. In other words, 45% of parents reported liking only one type of music.

When we asked parents what music they played when their babies were around, they reported playing classical music and rock with approximately equal frequency — about 45% of the sample responded "yes" for both categories. Naturally, parents reported playing children's songs and lullabies far more frequently for their infants than for themselves.

The PUMIS Survey Instrument and Sample

Instrumentation

Developed by a research team at Teachers College, Columbia University, led by the first author in consultation with other developmental researchers working on national studies of parenting, the PUMIS interview protocol included questions pertaining to the following areas of interest[1]:

- Demographic information, including respondents' sex, employment status, education, age, SES, and relationship to infant; number and ages of other children; definition of family unit and household; number and types of musical instruments and music recordings in home; and child care circumstances.
- Specific uses of the Smart Symphonies CD and/or other recorded music (including how often, where, and why it is used).
- Parent/infant responses to and preferences for the Smart Symphonies CD and/or other recorded music;
- Parent and child physical and mental health, including child temperament.
- Parent-child interactions (including musical as well as non-musical behaviors, such as book reading, playing, talking, etc.).
- Parent attitudes and beliefs about music and infants.

To insure parents had the opportunity to communicate any additional information, the survey concluded with the open-ended question, "Is there anything else you'd like to tell us about how or why you use music with your baby?"

The measure was refined through pilot testing in the field. Adaptations were made in the language of the questions to achieve greater clarity, and in the number of questions to ensure the interview could be accomplished in 20 to 22 minutes. A private survey firm was contracted to collect, record, and enter the data; several training sessions were held with the interviewers in order to secure their ability to address issues regarding the nature of specific items. Researchers monitored calls during the course of the interviewing process to ensure the validity and reliability of data collected.

Description of the Sample

The PUMIS survey was administered to a regionally focused national sample[2]. Respondents' telephone numbers were selected from a consumer tracking service list of eligible participants using a random-digit-dial (RDD) sample design. The respondents ranged in age from 15 to 55 years, the vast majority (90%) residing in two-parent households. Most participants were female (73%), and a similar majority was white. Our sample's Hispanic population was slightly higher than average; the number of people of Asian descent reflects the national figure. African-American families were underrepresented. Regional statistics more closely match the latest US Census information.

Respondents in our study tended to be more highly educated than the national average, with 16% having post-graduate degrees, as opposed to the national figure of 9%; however, over one-quarter of our sample does not have college experience. The median income for respondents was close to the national average of $40,800. Just under one-third of the respondents were not employed, most of them mothers (only 4% of fathers were unemployed). Thirty-eight percent of these mothers of 4- to 6-month-old infants worked full time, 21% worked part time, and 41% stayed at home full time with their infants. See Table 1 for a more complete description.

[1] Sociodemographic, general parenting, and mental health questions were extracted from related questionnaires and self-report measures. These include (a) Survey of Parents of Children Under Three (The Commonwealth Fund, 1995); (b) Healthy Steps Family Survey Parent Interview: 30-Month Follow-up Parents (Department of Maternal and Child Health, Johns Hopkins University, 1999); (c) Healthy Steps for Young Children: 6-Month Survey for Parents (Department of Maternal and Child Health, Johns Hopkins University, 1997); (d) Infant Characteristics Questionnaire – 13 Months (Bates, Freeland, & Lounsbury, 1979); (e) Psychiatric Institute Depressive Mood Inventory (Kandel, 1982); and (f) Parental Modernity Scale (Schaefer & Edgerton, 1985).

[2] This approach was chosen over a nationally derived sample to ensure greater compatibility between the treatment and control groups. New York and California were chosen because both contain urban, suburban, and rural populations, provide residence to a variety of ethnic populations, and are geographically disparate. The Midwest region was chosen to protect against possible biases attributable to coastal residency. Sampling involved 750 participants from each region.

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We also asked parents *why* they played music for their infants, using the following question:

Do you ever play music
to put your baby to sleep?
to entertain your baby while you do something else?
to dance or play with your baby?
to sing to your baby?
to calm or relax your baby?
to increase your baby's intelligence?

With some variation, most parents said "yes" to every question. When we asked them to choose the *one* reason they usually played music for their babies, the greatest number, just over 30%, said "To dance or play with [my] baby." Not only are infants predisposed to music-making (Trehub, 2001), but parents may be predisposed to acknowledging and supporting this engagement (Papousek, 1996). Only 13% said their primary reason for playing music was to increase a baby's intelligence. Twenty-two percent of those surveyed chose "to calm and relax [my] baby" as the main reason to play music, suggesting that the emotional content of music is a powerful motivator as well.

We then asked what parents what they noticed in their infants' behavior when they played music for them, using the same question format as the singing question above. Responses were similar in that the behaviors parents reported were far more active than passive. Interestingly, parents reported observing fewer behavioral responses overall to music than to singing. The intimate nature of parent–infant singing may elicit more observed responses (see, for example, Ilari, 2002). Future analyses comparing singing and playing practices may yield important findings in this area.

Use of Smart Symphonies™ CD

About half of the parents we interviewed had received the Smart Symphonies™ CD as a gift upon leaving the hospital as part of the Grammy Foundation/Mead Johnson Nutritionals distribution effort. Of the parents in our survey sample who had received the CD, 70% had played it at least three times with their babies present. (At the time of the survey, these babies were 4 to 6 months old.) We asked parents who had received but not used the CD to report their primary reason for not using the CD. The most frequent response was lack of time (29%); the second most frequent response was a dislike of classical music (25%). Sixteen percent of the group of parents did not use the CD because they had no CD player.

Parents' use of the Smart Symphonies™ CDs differed from their use of other recorded music. When asked about the primary reason they played the CD for their baby, 35% of the respondents chose "to calm or relax" an infant; the second most frequent response (32%) was "to increase baby's intelligence." Future analyses may provide clues to the reasons for these differences. For example, are differences simply due to the contrast in musical styles between Smart Symphonies™ and other recorded music parents play for babies? In other words, do parents play rock music when they want to arouse their babies and classical music like Smart Symphonies™ to calm their infants? (Of course, classical music may be rousing and rock ballads soothing, but parents — consciously or not — may choose recorded music on the basis of their experiences at live performances. The way we respond with our bodies at a rock concert is quite different from the way we respond to a concert of classical music.) Another explanation for reported differences may be that parents are responding to explicit and implicit messages provided with the Smart Symphonies™ CD and to media attention to the practice of playing classical music to babies.

General Attitudes Toward Music and Infants

A final section of the survey addressed general attitudes regarding music and infants. Most parents (54%) strongly agreed that "parents are naturally inclined to sing to their babies," and another 30% of parents mildly agreed with this view. Almost all parents *disagreed* — 86% of them strongly — with the statement, "Only people with beautiful singing voices should sing to their baby."

Almost all parents surveyed (more than 93%) agreed that playing music for babies was developmentally significant. However, beliefs in the connection between classical music and infants' intellectual growth were not as widespread. Only 27% of the parents surveyed strongly agreed with the statement, "Classical music makes babies smarter." Another 35% mildly agreed, and 28% were not sure. Future analyses will investigate possible sociodemographic and experiential associations with these attitudes; what does seem evident is that parents are in doubt about this connection.

Finally, we asked parents to respond to the statement, "I consider myself a musical person." Their responses varied extremely. Approximately one-third of parents strongly agreed; one-third mildly agreed; 11% strongly disagreed; and 16% mildly disagreed. Identifying oneself as a musical person may feel inappropriate: The cultural, institutional, and personal expectations of what the term "musical" means can contribute to feelings of musical inadequacy early in life (Custodero, 2002). However, the musical element of parenting infants — that is, the musical speech used by parents across cultures and the frequency with which respondents in the current study sing and play music for their babies — suggests that the earliest months of children's lives may be an especially musical time in the lives of their parents. The large number of parent respondents who *did* consider themselves musical may be experiencing what Mathilde Papousek (1996) refers to as "intuitive parenting" — that is, they have a sense of their own musicianship as a result of the musicality involved in caring for a baby:

> Parents intuitively enrich the infants' perceptual environment with what may be called an optimal model for early music education. But they do so unknowingly, and without formal training. Even if uninformed on infants' precocious competences, they engage the

TABLE 1. DESCRIPTION OF THE FAMILIES PARTICIPATING IN THE PUMIS STUDY

Characteristic	N	Percentage
Parent Gender		
Mothers	1614	71.7
Fathers	636	28.3
Child Gender		
Boys	1144	51.0
Girls	1099	49.0
Birth Order		
First-born	1168	52.0
Latter-born	1081	48.0
Parental Education		
High school or less	586	26.1
Some post–high school, no college diploma	661	29.4
College graduate	645	28.7
Post-graduate education	354	15.8
Family Income		
Below $20,000	257	13.1
$20,000 to under $40,000	475	24.2
$40,000 to $60,000	407	20.7
$60,000 to under $100,000	509	25.9
Over $100,000	316	16.1
Race/Ethnicity		
White	1609	72.4
Non-Hispanic Black and mixed-race with Black	138	6.2
Hispanic	340	15.3
Asian/Other	136	6.2
Employment Status		
Full-time	1184	52.8
Part-time	363	16.2
Not working	694	31.0
Mothers' Employment Status		
Full-time	926	41.3
Part-time	474	21.2
Not working	840	37.5
Fathers' Employment Status		
Full-time	2016	92.9
Part-time	76	3.5
Not working	79	3.6
Marital Status		
Two-parent family	2025	90.2
Single parent family	221	9.8

infant in elementary musical activities, seemingly with no other goal in mind than mutual enjoyment and relaxation. (p. 108)

What Have We Learned So Far?

We are currently in the process of analyzing survey data with regard to specific associations between variables presented in this report. The following descriptions begin to tell a story about the role of music in the lives of families with young infants in the United States, one that both confirms intuition and challenges assumptions:

- ***Music is important to parents of infants.*** The majority of our respondents sing and play music for their infants every day. Moreover, two out of three parents we surveyed said that they had made a conscious effort to expose their children to music while the infants were still *in utero*. An additional indication of the importance parents assign to early musical experiences came at the end of our 20-minute telephone interviews. When we asked parent interviewees if they had anything else to say about how and why they use music with their babies, more than 40% said they wanted to tell us "one more thing." Some examples:

  "I think with a mom and child it's a good thing to get your baby closer to you."

  "I knew when I went to a concert when I was six months [pregnant], she kicked the whole time. She likes action. She likes noise."

  "I think it will make him smarter, calmer. Make him learn things quicker."

- ***Parents think about the types of music they use with their infants.*** The music parents play when their infants are present is often different than the music they choose for their own use. They also sing repertoire traditionally meant for children.
- ***Parents notice infants' active (rather than passive) responses to musical stimuli.*** When they are singing or playing music, parents tend to notice when their babies actively respond with smiles, movement, and attentiveness more often than they notice infants becoming calm or falling asleep. Music is an important communicative tool between parents and infants.
- ***Parents may be influenced by the media messages about classical music, but it is unclear to what extent the messages are informing their practices.*** Our data are revealing an elaborate array of possibilities regarding this issue. Parents' lack of conviction in their responses to the statement, "Classical music makes babies smarter," coupled with the indications of practices surrounding the Smart Symphonies™ CD and the answers offered to the open-ended questions, resist simple explanation. While one parent reports playing a classical music CD because "I've heard it makes [babies] smarter," another parent replies, "I use [the CD] as a tool for bonding with [my baby]. She

seems to enjoy it and it adds to our bonding time. Classical music is more effective."

Future Directions

The current data set will provide valuable information on the attitudes and musical practices of parents with young infants. Additionally, we are interested in a longitudinal perspective — an investigation into how attitudes and practices regarding music and its function in the daily life of families may be consistent or may change over time. To begin to address this issue, we have completed a second phase of data collection. Phase II involved a written survey mailed to all respondents from Phase I during June 2001. Over 40% (N = 827) of the PUMIS I respondents returned the PUMIS II surveys. Analyses are currently under way, and early indications suggest differences in how parents use music with infants as their children mature (Sheu, 2002).

Phase III of the project involves in-home observational visits with a select group of families who completed Phases I and II. Pilot testing for the home visits is scheduled for the spring of 2003. During the home visits, we plan to investigate what music-making looks and sounds like in ethnically diverse urban families, with particular attention to parents' attitudes toward classical music. In a proposed fourth phase of the study, we plan to identify a group of families from the original survey sample who are willing to be part of a long-term study on the influences of early musical experiences on various aspects of human growth, development, and adaptation.

Fundamental to our research agenda is the belief that music makes lives better — for reasons that may be as varied as individual personalities and as universal as the heartbeat. Systematic investigation of how parents use music with their babies, toddlers, and older children will make a rich contribution to the expanding interdisciplinary scientific evidence base of the infant/family field. The greater our scientific understanding of what parents do spontaneously, the better we as practitioners can support parents and young children. Educational and therapeutic interventions that rest on a firm base of knowledge can enrich the musical lives of infants, toddlers, and families, and enhance development in the early years and beyond.

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THE TODDLER TOP 40:

Musical Preferences of Babies, Toddlers, and Their Parents

ELISSA JOHNSON-GREEN
LORI A. CUSTODERO
Teachers College, Columbia University, New York

I can't imagine a world without music. I'm sorry [academics] haven't argued more forcefully for the gift of music in children's lives simply for its own sake — for the beauty and light it brings into daily existence — rather than bowing to a pressure to tack on "academic" value, as in "Mozart helps kids build math skills," etc. It's enough that the world was graced with Mozart's brilliant music — to play it so new generations of children hear it as part of being human.

— Mary D., parent and respondent to the "Toddler Top 40"

In order to learn more about what songs and recorded music adults choose to sing and play for babies and toddlers and how children respond to the music, we recently asked parents and infant/family professionals who visit ZERO TO THREE's Web site (www.zerotothree.org) to give us basic demographic information about themselves and the infants and toddlers they care for, and to identify their children's favorite songs. We also gave respondents an opportunity to comment on what music meant to them and the babies and toddlers in their care. The "Toddler Top 40" survey revealed that parents and infant/family professionals find music not only a significant but an essential feature in young children's lives.

Of course, the respondents to this on-line survey do not constitute a representative sample of parents of infants and toddlers (compare Custadero, Britto, & Xin, this issue). Of the 141 people who responded, most were parents (72%), and many identified themselves as early childhood professionals (45%). Nearly all (136) were women, and ranged in age from 16 to 73 years, with a mean age of 30 years. Respondents said they were describing the favorite songs of children from birth to 17 years of age, and offered the favorites of boys and girls about equally.

According to our survey, "Itsy Bitsy [aka "Eentsy Weentsy"] Spider" is *the* favorite song of America's babies and toddlers, and has been for at least two generations. While respondents mentioned songs in a wide variety of genres and languages as their children's favorites, no other song came close to "Spider's" popularity.

Given the opportunity to comment further, 62% of the respondents wrote about why and when they use music with infants and toddlers, and what influences their decisions. Thirty percent of parents and professionals (including Mary D., quoted above) commented that music enhances the quality of young children's lives. For example, music can comfort a baby even during extreme stress. One mother con-

at a glance

- ZERO TO THREE Web site professional and parent visitors find music indispensable in their relationships with very young children.
- "Itsy Bitsy Spider" is by far the favorite song of America's babies, and has been for two generations.
- Music comforts and entertains children, helps them complete tasks and achieve goals, and strengthens the bonds between adults and children.

tributed the following:

> *I had an interesting experience with singing. My daughter was premature and came home a month after birth at 4 pounds. When she was 5 pounds, she choked on liquid iron supplement, and her respiration and pulse were in a dangerous range. When the emergency medical team arrived, they put me on the gurney and strapped me in holding my daughter. On our way to the hospital, I started singing a song to my daughter that I had sung to her every day for 2 months. Immediately she relaxed, and her color started looking better. It was a very effective way to connect with and relax my daughter when she was in a dangerous state.*

Parents and infant/family professionals also believe that music will make children well-rounded, happier people: "Music is amazing and I recommend that every parent sing to their baby every day [from the moment the baby is born]," wrote one respondent.

One in five respondents (20%) discussed the importance of routine in facilitating musical interactions with very young children. Parents reported using music in the car; during feeding, changing, and bath time; and at bedtime. As one parent observed, "Songs flow in and around our playtime, routines, and stories." Daily tasks are made special through music. When each task is connected with a specific song (for example, "The Clean-Up Song"), musical play becomes an integral and regular part of daily life.

Survey responses show that visitors to ZERO TO THREE's Web site use music to enhance the overall quality of children's lives rather than to achieve a specific goal (for example, making children "smarter.") What influences the musical choices that adults make? Some parents and infant/family professionals observed that culture is an important factor. Immersing infants and toddlers in the music of parents' cultures aids in developing bilingualism and cultural awareness. While respondents report using music to teach children language through listening and singing, their primary goal is introducing them to the traditions in which they were raised. According to survey respondents, religious songs and music are also a significant part of children's cultural immersion.

A number of respondents mentioned the media as an influence on their musical choices. They observed that children who take musical cues from the media tend to associate specific actions that they have learned through imitation with specific songs. One parent noted, "Even if my son is not looking at me or is several feet away while I'm singing [Barney's "I Love You"], when I get to the part that says 'And a kiss from me to you,' he comes running to me to kiss me before I can even finish the song! It's so amazing to see that he understands the action implied by the words, but even more amazing that he understands the timing of the action! I'm in awe at the level of functioning of such a young mind." This parent acknowledged the powerful response that music in the media elicits from young children, and identified the media as another source for daily, musical interaction.

The largest group of respondents by far (62%) discussed musical choice in terms of what Ellen Dissanayake (2000) calls "mutuality." This concept characterizes the relationship between parent and child as one in which communication mutually influences action. In other words, what the parent observes in the child dictates the parent's response to the child, and vice versa. Ideally, shared emotional sensitivity leads to a strong attachment between the parent and child. Survey respondents' comments suggest that they make musical choices based on the preferences and reactions of the infants and toddlers in their care, and that continuity of musical choice (for example, associating a specific song with a specific routine) strengthens the bond between adult and child.

Many respondents observed that music both influences affective behavior and encourages cognitive enrichment. As one mother noted, "My 22-month-old son loves all types of music. I chose 'Pat-A-Cake' [as his favorite] because he can join in singing and performing the song — clapping, rolling his hands, and finally poking a hole [in the cake]. Music always brightens his day. We never go a day without hearing music." According to another parent, "My 5½-month-old absolutely loves the 'Eentsy Weentsy Spider' song. Sometimes I don't even have to sing the words — just humming the tune calms and soothes her. Her face lights up whenever it's sung and her hands wiggle with excitement as she anticipates participating in the hand gestures that accompany the song." And yet another response: "My baby loves it when we sing to him; he has even started to sing back in his own little tune; it's just heartwarming to get a response off him." And lastly: "My baby loves to hear this interactive song ["Eentsy Weentsy Spider"]. I sing it to her in both English and Spanish. She can predict what is coming up next and tries to scrunch up her fingers to play along. We mostly sing it during play, but when she's fussy, this familiar tune, sung very low, seems to comfort her."

Parents' sensitivity to their children's preferences for and reactions to music is the common thread running through all these responses. Whether or not they believe that music will make children smarter or better or stronger people, survey respondents seem agree that music is an essential part of caring for babies and toddlers because the children themselves respond so positively to music. Mary D's comments eloquently capture the essential belief of the many parents and infant/family professionals who responded to the survey: Music brings beauty and light into daily existence, and we play music for our youngest children to teach them that it is part of being human. Babies' and toddlers' innate love of music makes it a natural part of their lives and, therefore, a natural part of our own.

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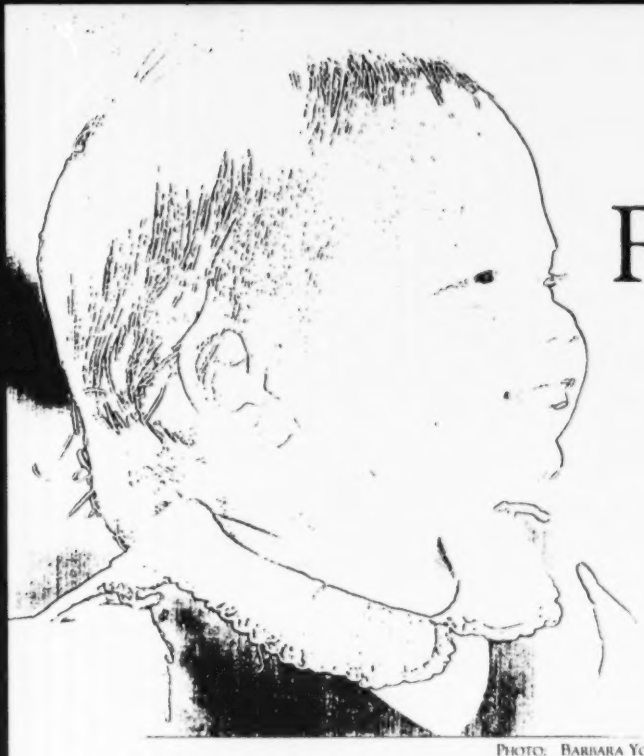

PHOTO: BARBARA YOUNG

MUSICAL RESOURCES FOR CHILDREN

BEATRIZ ILARI
McGill University, Montreal
and
ELISSA JOHNSON-GREEN
Teachers College, Columbia University, New York

Beatriz Ilari is a music educator and researcher specializing in young children. She recently received her PhD from McGill University in Montreal, where she works in the Infant Speech Perception Lab. **Elissa Johnson-Green** is one of the researchers of the Parents Use of Music with Infants Survey (PUMIS) at Teachers College, Columbia University, where she is currently working towards a Masters of Education degree. She has an MA in musicology and a one-year-old son, Saul. Drawing on their work with music, children, and families at Columbia University and elsewhere, Beatriz and Elissa compiled this distinctive list using parental anecdotes, observations from the lab and home, and their own tastes, intuitions, and perceptions. Items were chosen based on overall quality, educational value, and suitability for young children.

Classical

***Berceuse: Music of Calm and Peace*. Various composers. Naxos, CD #553843 (1999).**

Lullabies, nocturnes, and other soothing orchestral pieces make up this album. *Berceuse* takes parents and babies on a journey through music history that begins with Bach's Suite for Orchestra No. 3 in D major and ends with music by 20th-century composers such as Ravel and Stravinsky. Music from the Romantic period dominates this CD. Each performance is by a different orchestra; careful listeners may notice slight differences in quality.

***Build Your Baby's Brain 1*. Various composers. Sony, CD #60815 (1998).**

This album is first in the series inspired by the still-disputed "Mozart Effect." Classics such as Beethoven's *Für Elise* appear alongside selections from Vivaldi's *Four Seasons*, Schubert's *Trout Quintet*, and Bach's *Jesu, Joy of Man's Desiring*. The quality of these recordings is excellent, even if their beneficial effect on babies' cognitive development is yet unknown.

***Listen, Learn and Grow: Lullabies*. Various composers. Naxos, ASIN B00004TTJF (2000).**

This album is the best in this series of classical music CDs for children. The selection ranges from Brahms' "Wiegenlied" and Mozart's Variations for Piano in C Major (best-known to us as "Lullaby" and "Twinkle, Twinkle, Little Star," respectively) to Schumann's "Traumerei" from *Kinderszenen* and "Once in Springtime" from Josef Suk's *About Mother*. All of the pieces are soothing and tranquil, if some are not — technically — lullabies. The accompanying booklet is well-designed and informative. Look for other titles in the series, including *Listen, Learn and Grow: Newborn* and *Listen, Learn and Grow: Playtime*.

***Mommy & Me: Sleepytime Strings*. Various artists. Madacy Records, CD #980 (2000).**

Part of the *Mommy & Me* series *Adventures in Classics*, this album features less well-known pieces as well as familiar ones, such as Tschaikovsky's "Dance of the Sugar Plum Fairy" from *The Nutcracker* suite, and Pachelbel's Canon, "Solveig's Song" from Grieg's *Peer Gynt*, and "Barcarolle" from Offenbach's *The Tales of Hoffman*.

***Sweet Dreams*. Various artists. Sony, CD #44998 (1989).**

This compilation CD features the Philadelphia Orchestra and the Cleveland Orchestra and soloists such as Frederica von Stade. Most of the tunes on this classical CD are orchestral versions of familiar songs, including

Gershwin's "Summertime," Brahms' "Lullaby," and Debussy's "Claire de Lune." The overall expression is one of soothing beauty.

Lullaby and Playsong

***Happy Baby: For the New Arrival*. Various artists. Happy Baby Products, CD #15060 (1995).**

This album is part of large series of recorded music for young listeners called *Happy Baby*. It combines traditional lullabies ("Mockingbird" and "All Through the Night") with classical favorites such as "Greensleeves," Brahms' "Lullaby," and Schubert's "Ave Maria." In a unique twist, the songs are arranged and recorded in conjunction with computer-generated womb sounds. According to creator and researcher Fred Schwartz, MD, the mixture of womb sounds and music comforts and soothes the newborn. However, the computer-generated sounds can be monotonous, and parental singing may have better results.

***Lullaby Favorites: Music for Little People*. Various artists. Rhino Records, ASIN B0000033ZW (1997).**

This album contains traditional lullabies such as "Rock-a-Bye Baby," "Summertime," and "All Through the Night." Each song is arranged simply and accompanied by violoncello, guitar, piano, and other instruments. Unfortunately, the CD does not include an accompanying booklet, so those who wish to sing along must remember the lyrics or lean them through repeated listening.

***Lullabies: A Songbook Companion*. Various composers. ESS.A.Y Recordings, CD #1054 (1997).**

All the music on this CD is performed by Julianne Baird and Madeline Kapp (vocals), Mela Tenenbaum (violin & viola), and Richard Kapp (piano). The voice of Julianne Baird makes this album, which was produced by the Metropolitan Museum of Art, worth adding to a collection; she colors otherwise bland accompaniment. Lullabies range from old favorites to instrument-only renditions of spirituals. An attractive songbook illustrated with art from the museum's collection is available for purchase.

***Peter, Paul and Mommy*. Peter, Paul & Mary. Warner Brothers, ASIN B000002KAV (1969).**

This CD includes many familiar folk tunes and children's playsongs commonly associated with the artists, such as "Puff, the Magic Dragon." Parents who grew up listening to Peter, Paul & Mary and newcomers alike will appreciate the high quality of the performances. Some songs include children's voices.

***Toddlers Sing: Outrageous Vocals*. Various artists. Music for Little People, ASIN B00000C41T (1998).**

Toddlers Sing is an album of children's playsongs performed by toddlers. Instrumental accompaniment is clever, rhythmic, and varied; inviting performances encourage children and adults to move along with the music. Songs include "Itsy Bitsy Spider," "I'm A Little Teapot," and "Twinkle, Twinkle, Little Star."

***A Tisket, A Tasket: A Child's Rhythm Basket*. Brent & Lily Lewis. Ikauma Records (1997). No CD # available.**

Brent Lewis (percussion) and Lily B. Lewis (vocals) perform rhythmic renditions of traditional children's playsongs. These interesting and varied versions of familiar songs are fun and refreshing. Highly recommended.

***Songs & Games for Toddlers*. Bob McGrath. Bob's Kids Music, ASIN B00000HO3K (1998).**

Performed by Bob McGrath of *Sesame Street* fame, these songs, according to the label, are for 2- and 3-year-olds to actually "sing, play and do" themselves. The album comes with follow-along instructions for movement, and some songs require children to use their own instruments. Lyrics are not provided, but they are simple enough to learn aurally.

Popular Music Recordings

***Lullabies for Little Dreamers: Soft Rock Classics from Your Favorite Stars*. Various artists. Rhino Records, ASIN B0000033Q2 (1996).**

Aretha Franklin, James Taylor, The Carpenters, and Emmylou Harris are just some of the voices producing these lively yet peaceful renditions. Lyrics are written out in full for those wishing to sing along. Parents and caretakers — especially those who enjoy music of the 70s and 80s — are likely to feel an urge to dance and sing along.

***Bedtime with the Beatles: Instrumental Versions of Classic Beatles Songs*. Jason Falkner. Sony Entertainment, ASIN B00005R62U (2001).**

Can any song be turned into a lullaby? "Michelle," "Here, There and Everywhere," and "The Fool on the Hill" become, in the words of one reviewer, a "lush blanket of synths, guitar, bass and strings," lulling babies and parents alike to sleep. Lyrics are included in the accompanying booklet, encouraging one to sing — softly — along.

***Daddies Sing Goodnight*. Various artists. Sugar Hill Records, ASIN B000000F3B (1994).**

Country western and bluegrass make up this lively CD, which may induce dancing instead of sleeping. Doc Watson, The Red Clay Ramblers, and Leon Redbone contribute to the lineup of wailing fiddles and falsetto. Lyrics are provided, and performers comment on how they used the songs with their own children in the accompanying booklet.

World Music

***Lullaby: A Collection*. Various artists. Music for Little People, ASIN B000002M78 (1994).**

Artists such as Bobby McFerrin, Sweet Honey in the Rock, and Judy Collins perform traditional and familiar lullabies from diverse cultures. The CD jacket does not provide lyrics or other information. Highly recommended.

***The World Sings Goodnight*. Various artists. Silver Wave, ASIN B000000POT (1993).**

This album gathers world lullabies from 33 different countries sung by men and women, *a capella* and with accompaniment. While some of the recordings were done on location, others were recorded in a Colorado studio. The CD jacket does not provide information concerning each specific recording (i.e., where it was recorded, the singers' identities, lyrics) but does provide information about the meaning of each lullaby. The sound quality is excellent, as is that of the album's sequel, *The World Sings Goodnight 2*, released in 1995.

***The Planet Sleeps*. Various artists. Sony, ASIN B000002BOW (1997).**

This compilation of world lullabies was recorded on trips to places such as Algeria, Cambodia, Cameroon, Israel, Maori, and Tonga. Most of the songs are traditional lullabies in their countries, here accompanied by an instrumental ensemble or choir. The CD contains an interactive multimedia component that is aesthetically pleasing but does not work particularly well in the PC format. The excellent 36-page accompanying booklet includes information about each artist's experience and background and on the geography and history of each country included.

***Papa's Lullaby*. Various artists. Ellipsis Arts, ASIN B00005K9SH (2001).**

This album contains traditional lullabies performed by various male artists from countries including India, Sicily, Argentina, and the United States. Diversity makes the CD interesting as well as soothing. Each track is performed using an instrumental accompaniment traditional to the song's culture. The CD booklet provides information about the performers, and lyrics are given in the original languages with English translation.

***Mama's Lullaby*. Various artists. Ellipsis Arts, ASIN B00005A8IP (2001).**

This CD is part of a series of recordings for babies and young children. Here, traditional and recently composed lullabies are all sung by women. Most of the lullabies are accompanied, but those from Wales and India are entirely instrumental. Some of these songs are rousing enough to be classified as playsongs. The accompanying booklet provides lyrics. Other titles in this series include *Brazilian Lullaby*, *Cuban Lullaby*, *Guitar Lullaby*, *Mediterranean Lullaby*, *Papa's Lullaby*, and *World Music for Little Ears*.

***Brazilian Lullaby*. Various artists. Ellipsis Arts, ASIN B00001SI9K (1999).**

This album presents a fine introduction to children's music of Brazil. Brazilian singers and composers recorded these songs on location with traditional instruments such as the *berimbau* and the *reco-reco*. Some are traditional songs passed orally from one generation to another, seldom found in world music books or on recordings for children.

***Children's Songs From Around the World, Vol. 3: Lullabies*. Various artists. Arion, ASIN B000000TX4 (1995).**

This CD contains lullabies recorded in countries such as India, Senegal, Argentina, Brazil, Paraguay, Thailand, and China. This is a valuable album, not only because of the recordings' authenticity, but also for the richness of the songs. A booklet in English and French contains a brief introduction to the lullaby as a genre and information on each selection's country of origin. Lyrics are not provided. Most lullabies are sung *a capella* as solos or choral pieces. This album may serve as a learning tool for those educators and practitioners working in multicultural environments. The same applies to other albums in the *Children's Songs From Around The World* series: *Guinea & Senegal (Vol. 1)*, *South India (Vol. 2)*, *Nepal, Thailand, Malaysia & Indonesia (Vol.4)*, *China (Vol. 5)*, *South America (Vol. 6)*, and *Chicago-Gospel (Vol. 7)*.

***World Playground: A Musical Adventure for Kids*. Various artists. Putumayo World Music, ASIN B00000JT4P (1999).**

Although some of these are not children's songs, the selection suits children well. Alongside exotic instruments and styles, lyrics describe the lives of children in far-off lands. Adult voices predominate, although children's voices are heard in songs from Senegal and Israel. The accompanying booklet is both colorful and informative. This album does not contain soothing music. Lively and rhythmic songs from countries including Australia, Bolivia, Greece, Jamaica, and Canada will arouse and amuse children and parents. Excellent for moving and dancing with babies and children. Try *World Playground 2* also.

Music Videos

***Baby Mozart: Visual and Musical Experiences to Stimulate and Delight Your Baby*. The Baby Einstein Company, 2000. Duration: 30 minutes.**

This popular video combines Mozart, sound effects, and musical scales with images of toys and real-world objects. Mozart's works are performed with electronic keyboards and synthesizers. The manufacturers recommend this video for children ages 1 month to 3 years. *Baby Bach: Visual and Musical Experiences to Stimulate and Delight Your Baby*, is the second video in the series.

***Baby Music School: Classical*. The Baby School Company, 2000. Duration: 30 minutes.**

This video presents computer-generated images of animals accompanied by short pieces by Mozart, Saint-Saens, and others. The creators selected the images with our current knowl-

edge of infant visual development in mind: images are highly contrasted and moderately paced. Images and sounds are coordinated so that each animal corresponds to a single musical instrument. Each instrument is played without accompaniment, allowing babies to hear specific timbres. Unfortunately, the individual recordings of each instrument vary in quality: the flute and the piano are played extremely well, while the performances of the violin and the French horn are mediocre. Recommended for children between 6 months and 4 years of age.

Soundmakers

Baby Tap-A-Tune Piano. Little Tykes.
Ages 6 months to 3 years. $12.99.

This tiny, colorful piano is perfect for infants. The keyboard has four keys that form a major chord: any combination of keys will create consonance and harmony. Hammers on the inside of the instrument hit heavy metal chimes to produce a rich sound. The entire instrument will encourage tactile exploration, and the piano is practically indestructible.

Mozart Magic Drum. Embryonics.
Ages 1 year and up. $15.00.

Although this instrument is recommended for older infants and toddlers, younger babies will love to play with it, and the two hard plastic drumsticks that accompany the drum can be removed. In the drum's center, clear plastic sandwiches loose, colorful beads that act to produce a "wave" or "rain" sound when the body is tipped. Sound quality is fair to good. The drum also has a built-in handle that is perfect for small hands.

Baby's Wind Chime [kick toy]. Tiny Love.
Recommended for babies up to 10 months. $16.99.

Manufacturers designed this toy with attention to infant motor skill and sensory development. Babies will produce a delicate mix of sounds as they kick this colorful, three-sound chime. Although the manufacturers suggest that it be used as a healthy workout for both arms and legs, kicking seems to be the better and safer alternative. The chime can also be used to alert parents that their little one is awake. This toy may be hung on any crib.

Seek and Peek Turtle Activity Toy. Manhattan Toy.
Recommended for babies between 6 and 24 months. $15.00.

A delightful toy that allows babies to explore different sounds, including rattles and "crinkle" noises. Made out of a textured fabric, the colorful turtle has 6 activity pockets that foster exploratory behaviors in the auditory, sensory and visual domains. This toy also includes a tiny hidden baby turtle attached to the big turtle's belly, and a baby-safe mirror. Easily carried.

Lamaze Stacking Rings. Lamaze Baby Toys.
Recommended for babies 6 months and up. $19.95.

These stacking rings are quite a hit. The four rings and the post are made of washable colorful fabric adorned with contrasting graphic designs. Although this is not a musical toy, each soft ring contains a hidden sound for babies to explore that is easy for them to produce.

Baby Bach Touch and Play Pipes. The Baby Einstein Company.
Recommended for babies 9 months and up. $19.99.

This wonderful toy is shaped like a set of organ pipes. Each pipe is a different color and lights up when pressed. Each sounds when a button on the toy's front is pressed — a baby can then play the "instrument" along to the beautiful music. Baby can also play the pipes without the musical accompaniment, and can even change their timbre. This toy encourages musical improvisation — its best feature. Highly recommended.

Basic Beat Chiquita Shakers. Basic Beat.
Babies and toddlers with supervision only. $4.35 each.

These shakers are likely to delight young and mature performers. Lightweight and egg-shaped, the brightly colored shakers produce vibrant but delicate sounds: they can be used to play, accompany, and create different types of music.

Babies Make Music! kit. REMO Percussion.
Babies and toddlers with supervision only. $28.80-$35.20.

This kit contains a drum with accompanying wrist bell, music stick, scarf, maracas, mallets, and a book designed to suit the needs of very young performers. As with most musical instruments produced by REMO, the instruments in this baby kit are high-quality, especially the drum. Parents also have the option to purchase the explanatory *Babies Make Music!* video by Lynn Kleiner.

Lollipop Drum. REMO Percussion.
Recommended for children 18 months and up. $17.15.

This fun drum is shaped and colored like a lollipop and is available in three sizes. The sound quality is excellent and the instrument is light and easy to carry.

Solid Drum. Plan Toys.
Recommended for children 2 years and up. $19.99.

This drum is one of the best of its kind. The drum's wood and rubber composition makes it easy to hold and to carry, and it give babies and toddlers a chance to explore rhythm while producing beautiful sounds. The Oval Xylophone is another excellent option from Plan Toys that young performers can enjoy.

My First Drum. Wonderworld.
Recommended for children between 18 months and 3 years. $23.00.

This wooden drum is perfect for young performers: light, two-sided and easy to hold and to play. Children can create sounds similar to those of "real" drums, with or without the accompanying mallets. Especially recommended for toddlers.

PHOTO: JAMES SEXTON

WORK IN PROGRESS

A CENTER FOR FAMILIES AND CHILDREN IN THE MOUNTAINS OF NORTH CAROLINA

JAMES SEXTON
Mountain Area Child and Family Center
Asheville, North Carolina

A grassroots movement led by one woman who wanted to help needy children has grown into a comprehensive child development program serving the families and young children of Western North Carolina. Under the founding leadership of Margaret (Danny) Verner, its Board of Directors, and a gifted staff, The Mountain Area Child and Family Center (MACFC) has become one of the leading child development programs in the state. Located in the Swannanoa Valley, 10 miles east of Asheville, the MACFC recently was awarded an Early Head Start grant covering rural Buncombe County, allowing the Center to open its first satellite, the Montmorenci Center in West Asheville.

Beginnings

The woman central to the creation of the MACFC was born the child of Lutheran missionaries in India in the 1920s. A trained nurse and lifelong activist, Danny Verner brought an inner-city tutoring program, medical clinic, and numerous other quality-of-life initiatives to Charlotte, North Carolina, creating an interfaith alliance to address the devastating effects of poverty, racism, and homelessness in her home city. During the 1970s and 80s, Verner's endeavors reached as far as Haiti to serve children and families in need.

In 1991, the Verners retired to Montreat, located in the Swannanoa Valley near Asheville. Through a course for newcomers at nearby Warren Wilson College, Verner learned of the lack of high-quality child care in the area. Pooling their strengths and resources, seven of the course participants formed the "Swannanoa Valley Voice for Children" (SVVC), appointing Verner Chair of its Board of Directors. Working with the Buncombe/Madison Opportunity Corporation, the Superintendent of the Buncombe County schools, and a volunteer group that recruited local families for the pilot project, the SVVC had a Head Start classroom opened at the W. D. Williams School within a year.

They then turned their attention to Swannanoa Valley's child care needs. The SVVC envisioned a model, nonprofit program that would serve children from all socioeconomic backgrounds. The goals soon grew to developing multiple

Centers, a program to train child care providers, and an innovative, eco-friendly design. The Board identified four components of the model program:

1. **Child Care:** To help all children reach their full potential through a developmentally appropriate, culturally sensitive, and family-friendly education.
2. **Family Services:** To enable families to meet their needs so that they can meet their children's needs.
3. **Health:** To model ways to keep children as healthy as possible, and to teach healthy lifestyles to children, staff, and parents, partly through ensuring a healthy environment within the Child and Family Center.
4. **Teaching:** To provide learning opportunities for undergraduate students in early childhood education, and to provide research, observation, and continuing education opportunities for professionals working with young children.

Breaking Ground

In 1996, Asheville's Warren Wilson College agreed to lease the SVVC 3½ acres of land for one dollar a year in exchange for the proximity of the Center, which would benefit its own early childhood education program. The projected costs for the 13,900-square-feet facility totaled $3.6 million. As soon as the partnership agreement was reached, the Board used the monies they had raised so far from individuals and foundations to engage a professional fundraising firm, which procured substantial grants from the Janirve and Adelaide Worth Daniels Foundations. To garner more support and to change the prevailing perception that the Center would serve only Swannanoa Valley residents, the SVVC recruited Asheville community leaders to serve on its Board and changed its name to the more inclusive "Mountain Area Child and Family Center." After grants from organizations such as the Duke Endowment and the Eckerd Foundation supported the design and construction of the Center, the MACFC opened its doors on January 23, 2001.

Environmental Design

Situated against a wooded background, the MACFC reflects the belief that a healthy, safe, and beautiful environment is crucial for a child's healthy development. A 15-foot mural of a woodland scene inscribed "A Child Has a Hundred Ways of Listening/of Marveling/of Loving" welcomes visitors, and the earth tones and natural wood of the foyer evoke the rural surround. A coterie of wooden animals — a turtle, rabbit, bear, and deer — provide an opportunity for clambering and climbing, and "live" in a lofty atrium with several skylights that bring out the calming colors of the Center.

A greeting center where parents are required to sign their children in and out encourages communication among families, staff, and administration. To the right of the lobby, a Family Resource Center provides a computer station with Internet access. The room is also stocked with reference materials and toys, and is available to the Center's parents free of charge for community meetings and functions.

The extra-wide halls provide comfort and accessibility for the Center's many guests, and children's art covers every wall. The influence of the Reggio Emilia philosophy is everywhere: Documentation boards, projects, and creations in a variety of colors and media abound. Pastel tiles and low-level windows stimulate little eyes, as do skylights and creative interior lighting.

Past the accessible administrative offices, the four infant/toddler classrooms are filled with developmentally appropriate toys, materials, play areas, and work stations. From right to left, the rooms allow for greater and greater freedom and flexibility to suit the child's developing needs. In each room, a child's mastery of a corner loft provides a marker of her growing social and motor skills.

Off the lobby's left wing, two preschool rooms bracket the Adult Education room, kitchen, and staff lounge. These, while obviously made for bigger bodies, maintain the same spacious utility. Reflecting the Reggio philosophy, these two wings enclose a fully equipped art room. The adjacent multipurpose room is available for age-appropriate romping (especially in inclement weather) and reflects the MACFC's overall goal to provide enjoyment in a safe environment.

The outdoors also serves as a living classroom for the Center's children. A 1½-acre playscape features native flora, sand pits, climbing structures, embankment slides, and ground-level "tree houses." Nature trails branch out into the surrounding woods. This outdoor complex, which also includes sandboxes, play houses, tricycle paths, and an amphitheater, was cleared and built entirely by Warren Wilson students and community volunteers in a matter of weeks.

Research and Learning

Partnership with Warren Wilson College is central to fulfilling the teaching component of the MACFC plan. Early childhood education students use the on-campus Center for their field experience, and the Center is also used by students to fulfill their weekly work obligation, a unique aspect of enrollment at Warren Wilson. Students from surrounding schools also study at the Center. Senior-year nursing students from Western Carolina University spend a semester interning at the MACFC as part of their pediatric practicum — several have used the experience to write up case studies about children with special needs — and students from Asheville-Buncombe Technical Community College serve 4-week internships that meet twice a week to complete their early childhood education degrees. Interested visitors and professionals also come to observe and learn. Currently the Frank Porter Graham Child Development Institute at the University of North Carolina at Chapel Hill and ZERO TO THREE are using the Center as a site for field research.

Staff

The MACFC staff is one the main reasons this program is already drawing national attention. All teachers

have bachelor's degrees in education or related fields or associate's degrees in early childhood education. They are among the highest paid in the state. The small number of children assigned to each teacher — the ratio is roughly 4:1 — is another example of the MACFC's commitment to the highest quality care. Eventually, the MACFC would like teachers to spend up to 5 years with the same child, beginning with a connection to the pregnant mother, and has successfully moved teachers with their students in the majority of cases since its launch.

Creative Curriculum

For infants and toddlers, the MACFC uses the Creative Curriculum, which encourages teachers to help each child pursue his natural inclinations and interests rather than follow a scripted, generic lesson plan for the day. The Curriculum reflects MACFC's view that at each stage of life, children take on special developmental tasks and challenges related to their social, emotional, cognitive, and physical development. Children use their senses to establish security and form their identities, and to explore the people and objects in their world.

Parents at the MACFC

Parents are central to the MACFC's mission. The MACFC holds regular parent meetings, and parents are represented in the Center's decision-making process through committees and its Policy Council. Before the child's enrollment begins in the classroom, each parent has an initial interview with a member of the management team, who monitors each child's progress at the MACFC. The parent and teachers then work together to develop the initial curriculum and goals for the child. Parent and teachers meet throughout the child's enrollment at MACFC, reevaluating and setting new goals as old ones are met. Parents are asked to drop off and pick up their children at the classroom so that they will have an opportunity to talk with teachers, who also keep a daily record of each child's intake and activity for parents' review. In addition, a registered nurse on staff offers wellness courses and seminars, and vision, hearing, and dental screening for parents, staff, and children.

The MACFC curriculum also requires complete and consistent documentation of each child's development, an important tool for parents and teachers keeping track of a child's progress. Each child has a portfolio established for this purpose, which holds samples of the child's work, photographs of the child at work and play, and anecdotes and observations from parents and teachers.

Diversity

In keeping with the interests of Danny Verner and the founding members of the organization, remaining a "blended" program is a priority of the Board. The MACFC is committed to serving children with different abilities, backgrounds, and resources from birth to age 5. It is also committed to a "50/50" program, in which half of the families pay full tuition and half are subsidized through annual fund drives. The Center, staffed by an equally diverse group of individuals, is fully equipped to provide care for children with disabilities and special needs, who must always make up at least 10% of the Center's attendees. (Currently, 15% of the Center's children are diagnosed with special needs.) Children of all ages, races, colors, creeds, religions, backgrounds, and physical abilities learn that diversity is something to be appreciated and respected, not feared and misunderstood. In view of this, the MACFC has three staff members who are fluent in Spanish, who spread out their time between Asheville and the recently opened Montmorenci Center, located in a largely Latino community.

A Decade of Service

Perhaps the most remarkable aspect of the MACFC is that, in just 10 years, a small, independent group of committed people was able to harness human and financial resources to create a program that will benefit children and families for many years to come. In developing and supporting this Center through a combination of individual gifts, foundations, grants, corporate donations, and state and federal funds, the MACFC demonstrates that blended funding can work. We all hope that the growth of the MACFC can be used as a motivating example of what can happen when a group of dedicated individuals set their collective minds to something.

The MACFC demonstrates that blended funding can work

To help other communities meet similar challenges, the MACFC has developed a "Community Assessment" link on its Web site, **www.macfc.org**. This questionnaire helps determine what type of program would best benefit children and families in a given community.

Upcoming Issues

November 2002 — *The Role of Paraprofessionals in Early Childhood Intervention:* Jon Korfmacher, Erikson Institute, and Sydney Hans, University of Chicago, are co-guest editors of this issue, which features qualitative studies of infant/family programs that use paraprofessionals as home visitors, doulas, family child care providers, and peer breastfeeding advocates.

January 2003 — *The Impact of Adult Relationships on Early Development:* The relationships that adults have with other adults — particularly the relationships between a baby's parents or other close relatives or supporters — affect parents' ability to build positive, secure relationships with their babies and young children. Virginia Casper, Marion Forgatch, Frank Furstenberg, Judith Solomon, and Amy Susman-Stillman review the scientific literature in this area and report on their own studies of parents and young children in a range of family configurations.

March 2003 — *Community Partnerships for Quality Infant-Toddler Child Care:* With support from the Child Care Bureau and the Ewing-Kaufmann Foundation, ZERO TO THREE and Mathematica Policy Research have studied strategies for developing community systems to help families find infant-toddler care, blend funding sources to pay for care, and support providers to improve quality and develop professionally. This issue will feature case studies of community partnerships in Kansas City, KS; Sedalia, MO; Colorado Springs, CO; and Buncombe County, NC.

The Editorial Mission of the *Zero to Three* Bulletin

To provide a forum for thoughtful discussion of important research, practice, professional development, and policy issues in the multidisciplinary infant, toddler, and family field.

The Mission of ZERO TO THREE: National Center for Infants, Toddlers, and Families

ZERO TO THREE is a national nonprofit whose mission is to promote the healthy social, emotional, and intellectual development of our nation's infants and toddlers by supporting and strengthening families, communities, and those who work on their behalf.

www.zerotothree.org

Tooting Our Horn

ZERO TO THREE was thrilled to receive a 2002 EXCEL Award from the Society of National Association Publications (SNAP) in the editorial and graphic category of Most Improved Scholarly Journal. SNAP recognized *Zero to Three* for the redesign implemented last year to make its content more accessible and attractive to readers. We thank the talented staff at Touch Creative Group that has helped with this effort.

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